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Planning Commission Staff Report

TO: PLANNING COMMISSION

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MEETING DATE: NOVEMBER 3, 2021

SUBJECT: UP21-30 LI CYCLE - CONDITIONAL USE PERMIT: REQUEST TO APPROVE A CONDITIONAL USE PERMIT ON APPROXIMATELY 138,970 SQUARE FEET LOCATED AT 4450 E. NUNNELEY ROAD FOR A LITHIUM ION BATTERY RECYCLING FACILITY IN THE LIGHT INDUSTRIAL (LI) ZONING DISTRICT WITH A PLANNED AREA DEVELOPMENT (PAD). PER SECTION 2.902 OF THE LAND DEVELOPMENT CODE, GENERAL MANUFACTURING USES IN THE LIGHT INDUSTRIAL ZONING DISTRICT MAY REQUIRE A CONDITIONAL USE PERMIT IF HIGHLY TOXIC MATERIALS OR CHEMICALS, HIGHLY COMBUSTIBLE OR EXPLOSIVE MATERIALS, OR OTHER MATERIALS AND SUBSTANCES OF A NOXIOUS NATURE MAY BE USED IN THE RECYCLING PROCESS.

STRATEGIC INITIATIVE: Prosperous Community

To allow for a lithium ion battery recycling business to operate in an industrial park.

RECOMMENDED MOTION

Make the Findings of Fact and approve UP21-30 , Li Cycle: A Conditional Use Permit for approx. 138,970 sq.ft. located at 4450 E. Nunnelly Road to allow for a lithium battery recycling facility in the Light Industrial (LI) zoning district with a Planned Area Development (PAD) overlay, subject to conditions.

APPLICANT

Company: Earl & Curley
Name: Michelle Santoro/Rod Jarvis
Address: 3101 N. Central Ave. Ste. 1000
Phoenix, AZ 85012
Phone: 602-265-0094
Email: rjarvis@earlcurley.com

OWNER

Company: TC/P Gilbert Gateway LLC
Address: 2575 E. Camelback Rd.
Phoenix, AZ 85016
Phone: 480-239-9275
Email: rnorris@trammellcrow.com

BACKGROUND/DISCUSSION

History

Date	Description
December 20, 2005	Town Council approved annexation of approx. 102 acres (Ord. No. 1872) into the Town of Gilbert.
March 6, 2007	Town Council approved the Cooley Station at Santan and Power PAD (Z06-61, Ord. No. 1899) rezoning 74 acres of Maricopa County R-43 (Rural Residential) to 43 acres of Town of Gilbert Light Industrial (LI) and 31 acres of Regional Commercial (RC) with a PAD.
March 12, 2013	Town Council approved the removal and replacement of the Cooley Station at Santan and Power PAD with the American Furniture Warehouse PAD (Z12-27, Ord. No. 2419) including the rezoning of 10 acres from Light Industrial (LI) to Regional Commercial (RC) and with modified development standards.
June 5, 2021	Planning Commission approved DR19-29 Gilbert Gateway Commerce Center, a 3-building office/industrial development on 29-acres.

Overview

Located directly west of the existing American Furniture Warehouse and just north of the Santan Freeway, the Gilbert Gateway Commerce Center is a small industrial park southwest of Power and Warner Roads consisting of 3 industrial/office buildings totaling approximately 416,000 sq. ft. The proposed is located within

Building 2 of the 29-acre industrial park and is zoned Light Industrial (LI). Sole access to the site is provided from Power Road via Nunnelly Road. A future secondary industrial collector road is planned to connect north to the Warner Road right of way.

The Town of Gilbert's Zoning Administrator has determined Li Cycle's lithium ion battery recycling process requires the approval of a Conditional Use Permit for a General Manufacturing and Assembly Use involving highly toxic materials or chemicals, highly combustible or explosive materials, or other materials and substances of a noxious nature in the manufacturing process, as permitted by Section 2.902 (L27) of the Land Development Code.

Surrounding Land Use & Zoning Designations:

	Existing Land Use Classification	Existing Zoning	Existing Use
North	General Office and Industrial	General Office (GO) and Light Industrial (LI)	Undeveloped
South	Public Facility/Institutional	Public Facility /Institutional (PF/I)	Santan Freeway
East	Regional Commercial	Regional Commercial (RC) PAD	American Furniture Warehouse
West	Residential >0-1 DU/Acre	Single Family-43 (SF-43)	Non-subdivided residential community

Site	Industrial	Light Industrial (LI) PAD	Gilbert Gateway Commerce Center

Project Data Table

Site Development Regulations	Required per LDC	Proposed
Minimum Building Setback (ft.)		
Front	25’	100’ – 150’
Side (Residential, West)	75’	150’

DISCUSSION

Li Cycle is proposing to establish a lithium ion battery recycling facility in Building 2 of the Gilbert Gateway Commerce Center. They are proposing to use the entirety of the approximately 139,000 sq.ft. building as a regional first stage processing facility for their recycling process. Per the applicant, lithium ion batteries will be delivered to the site and stored at the northeast corner of the interior of Building 2. This first stage recycling facility will then break down the batteries into three non-hazardous and non-flammable intermediary products through a “water-based mechanical size-reduction process”. The resulting intermediary products, which include black mass concentrate (a collection of active anodic and cathodic material powder) will then be shipped to their hub facility in Rochester, New York for further processing into materials that can be re-used in new battery production.

According to Li-Cycle, their closed loop water-based battery recycling process is designed to minimize air emissions from the facility as well as being water negative, meaning no wastewater will be discharged from the facility.

The Planning Commission is required to make four findings in order to approve a Conditional Use Permit. The findings are listed here, along with the reasons why staff considers that the findings are or are not met in this case. These findings are:

1. ***The proposed use will not be detrimental to health, safety, or general welfare of persons living or working in the vicinity, to adjacent property, to the neighborhood, or to the public in general.***

The following three areas were identified by Town staff as having the potential to impact surrounding residents and as such, should require Town oversight with this Conditional Use Permit.

Hazardous Materials

As hazardous materials would be present on site with this facility, Town staff requested the applicant submit a hazardous materials report (Exhibit 5) for review with the Conditional Use Permit. The report was reviewed by the Town staff to ensure the materials present, quantities stored on site, locations of the hazardous materials, and emergency management systems meet Town standards. After review, staff has determined the facility meets Town standards.

Wastewater Discharge

According to the applicant, the proposed recycling facility is water negative and does not generate or discharge wastewater. Solutions generated by the recycling process are themselves internally recycled and reused within the facility. Li Cycle will be containing these water solutions to the facility by not installing drains in the main plant area so as to mitigate the risk of the water solution accidentally being released into the Town's systems or the surrounding environment.

Additionally, the Arizona Department of Environmental Quality (ADEQ) has issued the applicant a "Multi-Sector General Permit – No Discharge Certificate" (Exhibit 6). According to the attached permit, "ADEQ may inspect to verify that there is no discharge to a Water of the U.S. either directly or by way of a conveyance and that any unpermitted discharge may be subject to an enforcement action under the Clean Water Act and Arizona law".

Air Emissions

According to the applicant, the water-based recycling process was specifically developed by Li Cycle so that noxious fumes created by the process are contained by the water and not released into the air. The applicant has received a "Non-Title V" air emissions permit from the Maricopa County Air Quality Department (Exhibit 7). Per the attached permit, this facility shall not allow emissions into the atmosphere in excess of any of the following:

	Twelve Month Rolling Total Emissions Limits (lbs)
Particulate Matter <10 Micron Diam. (PM10)	200.0
Particulate Matter <2.5 Micron Diam. (PM2.5)	200.0
Volatile Organic Compounds (VOC)	1000.0

The Town's Department of Environmental Compliance has reviewed both permits and had determined the applicant is in compliance with Town standards.

2. ***The proposed use conforms to the purposes, intent, and policies of the General Plan and its policies and any applicable area, neighborhood, or other plan adopted by the Town Council.***

   Staff has determined Li Cycle's proposed lithium ion battery recycling facility conforms to the 2020 General Plan's following goals and policies:

   - *Opportunity Goal 1 – Encourage Job Growth*
   - *Opportunity Goal 1 Policy 43 – Support the development, growth, and retention of small businesses*
   - *Opportunity Goal 1 Policy 41 – Promote and support business creation, innovation entrepreneurship, and expansion*
   - *Opportunity Goal 5 Policy 73 – Support sustainable energy practices by promoting energy conservation and alternative energy use and production;*

3. ***The proposed use conforms to the conditions, requirements, or standards required by the Zoning Code and any other applicable local, State, or Federal requirements.***

   As conditioned with a valid CUP, as well as the attached county and state environmental permits, the proposed use complies with the Land Development Code standards for the Light Industrial zoning district. The use shall adhere to any nuisance laws under the Municipal Codes such as, but not limited to, noise and odors.

4. *The proposed use, as conditioned, would not unreasonably interfere with the use and enjoyment of nearby properties.*

   Town staff has analyzed the three potential negative impacts of the proposed facility (hazardous waste, wastewater discharge, air emissions) and has determined the processes and procedures Li Cycle uses will appropriately mitigate any potential negative external impacts on the surrounding residents and businesses.

Pursuant to the above analysis, Staff is of the opinion that the project meets the four findings required for granting the Conditional Use Permit.

PUBLIC NOTIFICATION AND INPUT

A notice of public hearing was published in a newspaper of general circulation in the Town, an official notice was posted in all the required public places within the Town and neighborhood notice was provided per the requirements of the Land Development Code Article 5.205.

At the request of Town staff, the applicant has held two neighborhood meetings, on July 27, 2021 and August 12, 2021 to inform the residents of their process and to answer any questions they might have.

The 1st neighborhood meeting was attended by three residents who had concerns with the potential for wastewater from the facility seeping into the groundwater system and contaminating the wells used by the neighborhood to the west. The applicant explained to the resident how Li Cycle uses a closed system to mitigate the discharge of wastewater into the surrounding area.

In an effort to appropriately inform surrounding residents and businesses that may be impacted by the proposal, staff determined that an expanded notification area was warranted for the 2nd neighborhood meeting. Four residents were present at the meeting. One resident raised concerns with Li Cycle regarding the presence of hazardous materials on site and how it could impact the surrounding community. The resident requested a copy of the Hazardous Materials Report, which the applicant mentioned they would provide.

PROPOSITION 207

An agreement to "Waive Claims for Diminution in Value" pursuant to A.R.S. § 12-1134 was signed by the landowners of the subject site, in conformance with Section 5.201 of the Town of Gilbert Land Development Code. This waiver is located in the case file.

STAFF RECOMMENDATION

Make the Findings of Fact and approve UP21-30 , Li Cycle: A Conditional Use Permit for approx. 138,970 sq.ft. located at 4450 E. Nunnelly Road to allow for a lithium battery recycling facility in the Light Industrial (LI) zoning district with a Planned Area Development (PAD) overlay, subject to conditions:

a. Any changes to the type of hazardous material or the quantities of hazardous materials stored on site as described Hazardous Materials Inventory Sheet in attachment 5, *Hazardous Materials Report*, shall require the review and approval of an amendment to this Conditional Use Permit by the Planning Commission.

b. A *Multi-Sector General Permit – No Discharge Certificate* shall be required for the lifetime of the use at this facility. The applicant shall provide the Town a copy of a renewed No Discharge Certificate from the Arizona Department of Environmental Quality prior to its expiration.

c. Water-based solutions generated by the recycling process shall be internally contained and not discharged into the Town's stormwater or groundwater retention systems. Any changes to this process shall require the review and approval of an amendment to this Conditional Use Permit by the Planning Commission.

d. The facility shall remain in compliance with the air emission standards and conditions set forth in the attached *Maricopa County Air Quality Department Non-Title V* permit #P008317. The applicant shall provide the Town a copy of a renewed Non-Title V permit from Maricopa County Air Quality Department prior to the expiration of permit #P008317. Any future increases to the allowable emissions set forth in Section 3 of permit #P008317 shall require the review and approval of an amendment to this Conditional Use Permit by the Planning Commission.

Respectfully submitted,

Josh Rogers
Planner II

Attachments and Enclosures:

1) Findings of Fact
2) Notice of Public Hearing/Vicinity Map
3) Aerial Photo
4) Applicant's Narrative
5) Hazardous Materials Report
6) ADEQ No Discharge Certificate
7) MCAQD Non-Title V Permit

FINDINGS OF FACT
UP21-30 – Li Cycle

1. The proposed use will not be detrimental to health, safety, or general welfare of persons living or working in the vicinity, to adjacent property, to the neighborhood, or to the public in general;

2. The proposed use conforms with the purposes, intent, and policies of the General Plan and its policies and any applicable area, neighborhood, or other plan adopted by the Town Council;

3. The proposed use conforms with the conditions, requirements, or standards required by the Zoning Code and any other applicable local, State, or Federal requirements; and

4. The proposed use, as conditioned, would not unreasonably interfere with the use and enjoyment of nearby properties.

Notice o **Attachment 2: Notice of Public Hearing/Vicinity Map**

PLANNING COMMISSION DATE: *Wednesday, November 3, 2021* TIME: 6:00 PM*

LOCATION: Gilbert Police Department- Amphitheater
75 E Civic Center Dr.
Gilbert, AZ 85296

*Call Planning Division to verify date and time: (480) 503-6589
The application is available to the public for review at the Town of Gilbert Planning Division Monday - Thursday 7AM - 6PM. Staff reports and the agenda are available prior to the meeting at www.gilbertaz.gov/departments/development-services/planning/planning-commission

REQUESTED ACTION:

UP21-30 LI CYCLE - CONDITIONAL USE PERMIT: Request to approve a Conditional Use Permit on approximately 138,970 square feet located at 4450 E. Nunneley Road for a lithium ion battery recycling facility in the Light Industrial (LI) zoning district with a Planned Area Development (PAD). Per Section 2.902 of the Land Development Code, General Manufacturing uses in the Light Industrial zoning district may be required a conditional use permit if highly toxic materials or chemicals, highly combustible or explosive materials, or other materials and substances of a noxious nature may be used in the recycling process permit.

SITE LOCATION:

APPLICANT: Earl & Curley
CONTACT: Rod Jarvis/Michelle Santoro
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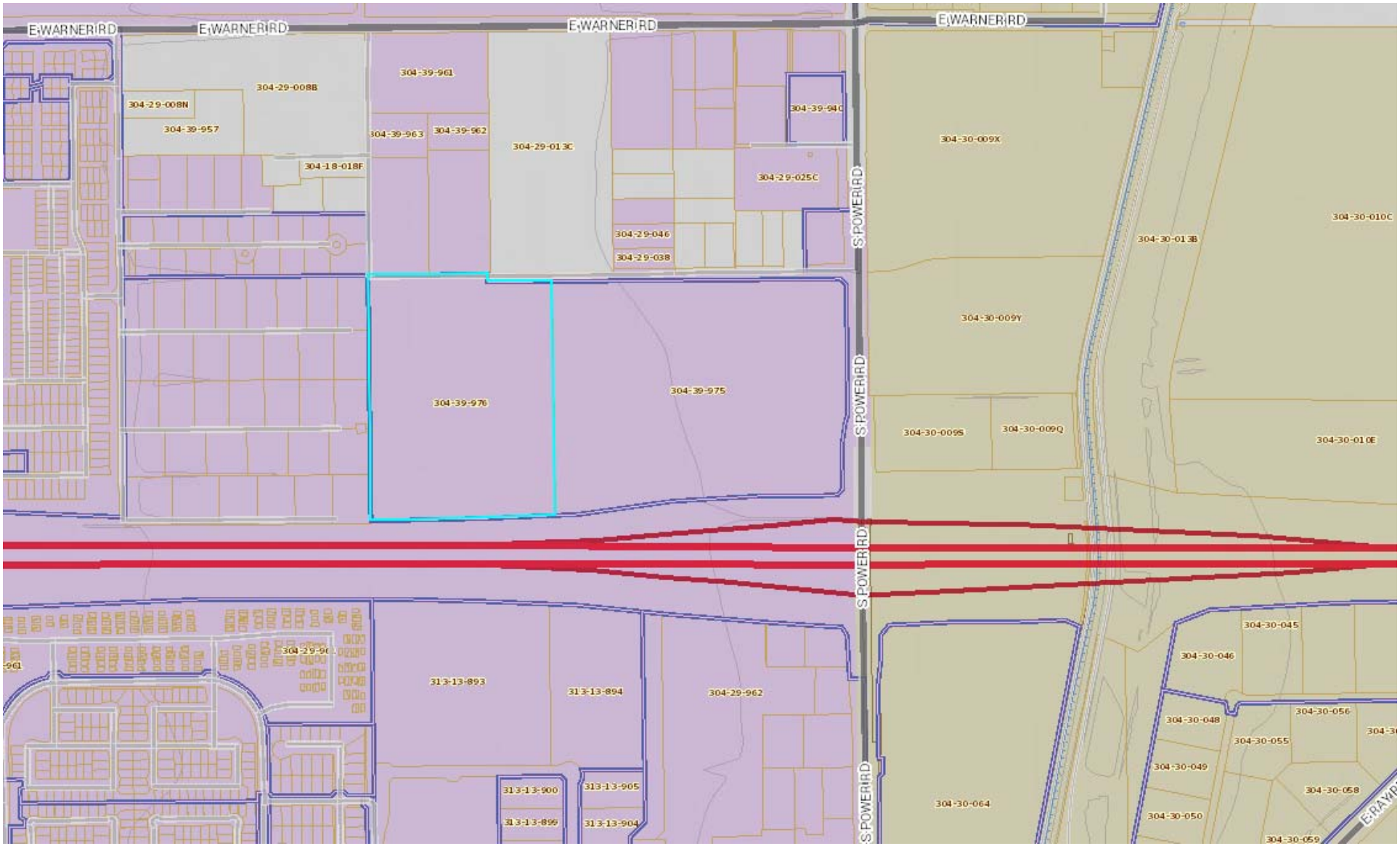
Phoenix, 85012

TELEPHONE: (602) 265-0094
E-MAIL: rjarvis@earlcurley.com
msantoro@earlcurley.com

Aerial Map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304-30-046
304-30-048
304-30-056
304-30-055
304-30-049
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304-30-059

Parcel Map

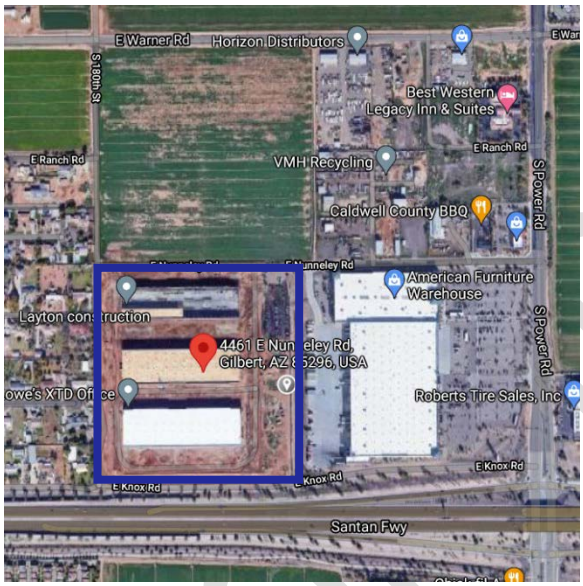
100 Latona Road, Building 350
Rochester NY 14615, United States
Tel. +1 877 LI-CYCLE • www.li-cycle.com

Conditional Use Permit: Project Narrative

Introduction

Li-Cycle Inc. ("Li-Cycle") is a lithium-ion ("Li-ion") battery recycling company intending to install and operate a battery recycling facility within the Gilbert Gateway Commerce Park (the "Park"). Over the past year, Li-Cycle has engaged with the Town of Gilbert to understand the steps required to ensure compliance of Li-Cycle's facility within local jurisdiction. A Zoning Interpretation Letter was requested and received from the Town, indicating that Li-Cycle's proposed use complied with the local zoning designation if a conditional use permit ("CUP") was filed. Li-Cycle accepted the Town's request, as Li-Cycle agrees with the Town's assessment to ensure compatibility with the surrounding area and residents and is confident that all requirements will be met for the CUP.

Location



Li-Cycle's proposed operations will be located at 4461 E. Nunneley Road in Gilbert, AZ, located within the Gilbert Gateway Commerce Park. The major intersection in proximity is the 202 Santan Freeway Loop and South Power Road. The figure to the left provides an aerial map of the building, Park, and surrounding location.

The location is currently zoned as Light Industrial, in which Li-Cycle's proposed operations fall under. Residential properties are located west of the Park, while commercial properties are located east of the Park. The Park contains two additional buildings currently used for warehousing.

Figure 1: Aerial map of the Gilbert Gateway Commerce Park and surrounding areas.

Background

The use of Li-ion batteries in automotive, consumer electronic, and other industrial and household applications has grown exponentially over the last few years and will continue to do so in the foreseeable future. Improved technology and supply chain innovations are required to meet the rapidly growing demand for critical and scarce battery materials. Existing Li-ion battery recycling technologies including smelting and other high-temperature processes are energy intensive, high carbon footprint, and resource inefficient, contributing to non-sustainable practices. To combat these processes, Li-Cycle has developed Li-Cycle Technology™ (the "Technology™"), an innovative and novel process which provides an economically viable, safe, and environmentally friendly process that can recycle all types of Li-ion batteries and will ensure a sustainable supply of critical rechargeable battery materials.

100 Latona Road, Building 350
Rochester NY 14615, United States
Tel. +1 877 LI-CYCLE • www.li-cycle.com

The Technology™ utilizes a Spoke and Hub model, a two-stage process where batteries are recovered into critical battery materials. Li-ion batteries are first received at regional facilities, the *Spokes*, where batteries are safely broken down into small pieces through a water-based mechanical process to create three non-hazardous and non-flammable intermediate products, including a black mass concentrate, containing the valuable components of a Li-ion battery, shred plastics, and shred metals, internal and external components of a Li-ion battery. The process has been designed such that all process flows are closed loop, resulting in no waste materials or streams generated. Black mass concentrate from the Spokes is shipped to a centralized processing facility, the *Hub*, where it is chemically refined to produce battery grade materials, effectively closing the supply chain loop for Li-ion batteries. The shred plastics and metals are shipped to Li-Cycle's offtake partners for further resource recovery.

Li-Cycle has signed a 10-year lease for Building 2 in the Gilbert Gateway Commerce Park, where a Spoke, designated as Spoke 3, will be installed and capable of processing 10,000 tons of Li-ion batteries per year. Li-Cycle has selected the Town of Gilbert for its operations as a highly-skilled, diverse, and productive workforce is present and is also strategically located in proximity to many of Li-Cycle's potential business partners. Spoke 3 will be modular, such that equipment will be pre-assembled on metal frames prior to delivery in Gilbert. Once delivered, the modules will be assembled together and tied into the existing building utilities.

Figure 2: Li-Cycle's existing modular facility in Rochester, NY, to be duplicated and installed in Gilbert, AZ.

For this project, Li-Cycle will invest a minimum of $10 US million and create a minimum of forty (40) jobs within the Town of Gilbert and East Valley to operate and support the facility, and positively contribute to the local economy. Li-Cycle anticipates that installation and commissioning for the facility will start in December 2021 and be fully operational in January 2022.

Findings Required for Approval of Administrative Use Permit

1. *The proposed use will not be detrimental to health, safety, or general welfare of persons living or working in the vicinity, to adjacent property, to the neighborhood, or to the public in general.*

Health

Li-Cycle has implemented the following measures to minimize adverse health risks to the public:

- Minimal air emissions will be exhausted from the facility. Li-Cycle's air emissions will be designated under a Non-Title V permit in Maricopa County, indicating that the facility's emission levels are

significantly under major thresholds – the projected emissions are not expected to exceed 10% of the minimum threshold limit. There is no smog, greenhouse gases, or odors emitted directly from Li-Cycle's process.

- Li-Cycle's process is water negative, indicating that no industrial wastewater is generated or discharged from Li-Cycle's process. Solution generated from the operations are reused within the facility, making the system closed loop. Only sanitary wastewater is discharged to local sewer systems. A non-discharge certificate (NDC) will be issued for Li-Cycle's facility.
- No drains have been installed in the main plant area in Li-Cycle's facility, minimizing the risk of solution released to the surrounding environment. As a result, no contamination of local wells or aquifers should be observed.
- Steel berms will be installed in Li-Cycle's facility, surrounding the plant area. A waterproof, epoxy material will also be coated on the plant floor. These point-source risk mitigation techniques have been effective in Li-Cycle's facilities to date to minimize and prevent leaks.

Safety

Li-Cycle has implemented the following measures to maximize the safety of the public.

- Li-Cycle's operations utilize a low energy and unique water-based solution which minimizes the risk of fire and other battery related hazards during the manufacturing process.
- Li-Cycle has developed safety policies, emergency plans, and fire safety plans to address the storage and handling of Li-ion batteries and Li-Cycle's operations. To date, Li-Cycle has not recorded any major incidences that would endanger the safety of the public.
- Fire protection systems have been designed and integrated into Li-Cycle's plant design, including fire hose reels, automated water spray bars, and temperature sensors. Early Suppression Fast Response (ESFR) sprinklers are fitted into Li-Cycle's building.
- Chemicals used in Li-Cycle's facility are stored indoors and limited to single pallet quantities to minimize the risk of exposure and spills. These chemicals are commonly found in household items, including drain cleaner, dental products, and garden supplies. A hazardous materials code report has been completed confirming that the building is sufficiently fitted with the necessary response systems to handle and store chemicals within the facility.
- Li-Cycle's existing facilities are currently and will be certified for ISO 9001 (Quality Management), ISO 14001 (Environmental Management), and ISO 45001 (Occupational Health & Safety Management).

General Welfare

Li-Cycle has implemented the following guidelines to ensure the general welfare of the public.

- Minimal noise is generated from Li-Cycle's operations. Noise emitted from Li-Cycle's operations will not be audible from the exterior of the facility and contained within the building premises.
- Minimal truck traffic will be observed with Li-Cycle's operations. A maximum of 4 – 5 trucks daily will be entering Li-Cycle's premises, operating only within the hours specified in the Town of Gilbert's noise ordinance bylaw(s).

- Minimal water consumption and energy usage is observed with Li-Cycle's current operations. When compared with traditional means to produce one tonne of equivalent battery materials, Li-Cycle's process offsets a minimum of 90% water used that would otherwise be consumed through traditional processes.

2. *The proposed use conforms with the purposes, intent, and policies of the General Plan and its policies and any applicable area, neighborhood, or other plan adopted by the Town Council.*

Key policies from the Town of Gilbert's General Plan have been identified where Li-Cycle would be able to assist and support the Town's growth over the next few years:

- ***Policy 25:*** *Expand and promote opportunities for all residents to connect socially and participate fully in the vitality of Gilbert.*
  Li-Cycle participates in numerous community events and fundraisers. Annually, Li-Cycle hosts the Holiday Giving Back Campaign to support food banks located across the United States and Canada. Li-Cycle has also partnered with nonprofit organizations to provide access to technology for low-income individuals and families through the distribution of refurbished laptops and computers. Lastly, Li-Cycle recently kicked off its first annual fundraiser in the fight against cancer, in which all employee donations were matched with a corporate donation.
- ***Policy 40:*** *Develop a skilled and diverse workforce that supports and attracts future economic growth.*
  A minimum of forty (40) local jobs will be created to support and facilitate Li-Cycle's operations. The created jobs will include plant operators, mechanics, and supervisory and management staff which Li-Cycle will train. This will further bolster the technical and practical skills of the local workforce, attracting and assisting in future economic growth.
- ***Policy 69:*** *Support environmentally-responsible waste management practices.*
  Li-Cycle's proposed operations introduce an alternative, sustainable, and environmentally friendly waste management strategy for end-of-life Li-ion batteries. By introducing a facility that recovers critical materials from Li-ion batteries, it encourages and provides local awareness for the proper steps needed to discard and dispose of Li-ion batteries, which would otherwise report to landfills.
- ***Policy 73:*** *Support sustainable energy practices by promoting energy conservation and alternative energy use and production.*
  Compared with existing Li-ion battery recycling processes, Li-Cycle's operations are low cost, low energy, and resource efficient. As a result, Li-Cycle's carbon footprint is significantly lower than conventional technologies, supporting sustainable energy practices and conservation.
- ***Policy 77:*** *Encourage the purchase of fuel-efficient and alternate fuel Town vehicles.*
  Up to four (4) electric vehicle charging stations will be installed at Li-Cycle's facility. This will expand and encourage the use of alternative and low carbon fuel vehicles to the public, and mitigate the effects of vehicular pollution.

3. *The proposed use conforms with the conditions, requirements, or standards required by the Zoning Code and any other applicable local, State, or Federal requirements; and*

The Gilbert Gateway Commerce Park is designated as Light Industrial under the Zoning Code, permitting for Light and General manufacturing. As Li-Cycle's operations involve the production of a mass (black mass concentrate) from a raw or secondary material (Li-ion batteries), the operations can be characterized as General Manufacturing, under Article 6.1 of the Land Development Code. To ensure conformity of the above, Li-Cycle has requested and received a Zoning Interpretation Letter from the Town of Gilbert, confirming that Li-Cycle's operations would be designated and acceptable under General Manufacturing given that a conditional use permit is filed.

Li-Cycle has contracted the services of Environmental Resources Management (ERM), a consultant specializing in environmental services. To ensure that Li-Cycle's operations conform with environmental regulations, ERM will assist Li-Cycle in filing applications for municipal, state, and federal level environmental permits, including a Non-Title V air permit through the Maricopa County Air Quality Department and Environmental Protection Agency (EPA) Identification Numbers through the Arizona Department of Environmental Quality. Li-Cycle anticipates that all environmental permit applications will be filed in advance of the proposed start date for operations within the facility. Municipal permits including construction and building permit applications will also be filed with the corresponding agencies in a timely and orderly fashion.

4. *The proposed use, as conditioned, would not unreasonably interfere with the use and enjoyment of nearby properties.*

Li-Cycle's operations are wholly contained within the building premises and will not interfere with the use of nearby properties. The following are examples of Li-Cycle's operations not unreasonably interfering with the use and enjoyment of nearby properties:

- Material Storage: All materials received and produced from Li-Cycle's operations (feed, end-product) will be stored within the building premises (in accordance with the applicable regulations/laws). No materials will be stored outdoors.
- Traffic and Noise: Minimal truck traffic will be observed. Trucks will only enter and leave the premises during typical business hours, to ensure that noise generated from transport is within the noise ordinance specified by the Town of Gilbert and to reduce noise pollution to the public.
- Odors: Li-Cycle's process does not produce any odors. As a preventative measure, Li-Cycle will install several pollution control devices to clean and filter any exhaust streams produced from Li-Cycle's facility.

Conclusion

Li-Cycle believes that Gilbert, Arizona is the ideal location for its Li-ion battery recycling facility. The proposed use complies with local zoning laws, the Town of Gilbert's General Plan, and environmental regulations. Li-Cycle has also taken the necessary steps to demonstrate that the proposed operations will not be a threat to the health, safety, and welfare of the Town, its residents, and its businesses. Li-Cycle will contribute to the local economy by creating jobs and bolster the workforce's skillsets to assist in the Town's future economic growth.

Report

HAZARDOUS MATERIAL CODE REVIEW REPORT

Li-Cycle Facility

PREPARED FOR

Trammell Crow Company
2575 East Camelback Road, Suite 400
Phoenix, AZ 85016

Project #: 1JCP21028
Date: 5/20/2020

JENSEN HUGHES
Advancing the Science of Safety

Jacob Pittman
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Las Vegas, NV 89119 USA

jpittman@jensenhughes.com
+1 (702) 620-5692

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1.0 Applicable Codes

The codes and standards applicable to the project are as follows:

+ International Building Code (IBC), 2018 Edition, as adopted and amended by the Town of Gilbert.

+ International Fire Code (IFC), 2018 Edition, as adopted and amended by the Town of Gilbert.

+ NFPA 13, 2016 Edition, as adopted and amended by the Town of Gilbert.

2.0 Definitions

The IBC and IFC general provision of hazardous materials define the following items:

+ **Control Areas:** Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used, or handled.

+ **Hazardous Materials:** Those chemicals or substances which are physical hazards or health hazards as defined in Chapter 2 of the IBC and IFC, whether the materials are in usable or waste condition.

+ **Health Hazard:** A classification of a chemical for which is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term “health hazard” includes chemicals that are toxic, highly toxic, and corrosive.

+ **Storage, Hazardous Materials:** The keeping, retention, or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.

+ **Use (Material):** Placing a material into action, including solids, liquids, and gases.

+ **Use, open systems:** The use of a solid of liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

+ **Use, closed systems:** The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the project are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gasses. Examples of closed systems for solids and liquids include product conveyed through a piping system into a closed vessel, system or piece of equipment.

+ **Safety Data Sheets (SDS):** Information concerning a hazardous material which is prepared in accordance with the provision of DOL 29 CFR Part 1910.1200.

3.0 Project Description

The facility is located in the existing Gilbert Gateway Commerce Center site. The project will consist of the build-out of Shell Building 2 located at 4461 East Nunneley Road in Gilbert, Arizona. The facility “Spoke 3” building will house Li-Cycle’s Safe Size Reduction Technology™ to process lithium-ion batteries utilizing a mechanical size-reduction process to create end products of black mass concentrate, shredded plastics, and metal foils. Black mass is an end product produced from Li-Cycle’s Spoke facility. It is an agglomeration of anodic and

cathodic powders found from lithium-ion batteries, containing graphite and cobalt/nickel/lithium oxides. Lithium-ion batteries will be delivered to site and stored in demarcated aisles in the battery storage and staging room located in the northeast corner of the building before undergoing the recycling process.

Hazardous materials used and stored in the building are required to comply with the applicable sections of the 2018 International Building Code (IBC) and 2018 International Fire Code (IFC) both as adopted and amended by the Town of Gilbert. As part of the Town of Gilbert Amendments and discussion with the Town of Gilbert, the submittal of a Hazardous Material Inventory Statement (HMIS) and a Hazardous Material Management Plan (HMMP) are required. The HMIS has been prepared by Jensen Hughes (See Appendix A) while the HMMP has been prepared by Li-Cycle (See Appendix B). The hazardous material classifications are based on the Material Safety Data Sheets (MSDS) and Safety Data Sheets (SDS) that Li-Cycle has provided based on their records. The lithium-ion batteries located on site will not be classified as a hazardous material based on the SDS sheet provided by Li-Cycle located in Appendix C of this report. As such the lithium-ion batteries are not part of the HMIS provided in Appendix A.

The HMIS is intended to inform the Town of Gilbert Fire Department of the classification and quantities of hazardous materials in the building. The HMMP is intended to inform the Town of Gilbert Fire Department of the locations of the hazardous materials, emergency equipment, facility evacuation meeting locations, and locations of all exits.

Based on the information provided by Li-Cycle, no hazardous materials on site will exceed the Maximum Allowable Quantities (MAQ). Specific process or equipment design requirements are outside the scope of this report.

4.0 Building Description

The existing Building 2 is a Type V-B building and equipped throughout with an automatic fire sprinkler system designed in accordance with NFPA 13 and will be surrounded and adjoined by public ways or yards not less than 60-feet in width. Therefore, the building is permitted to have unlimited area in accordance with IBC Section 507.3. The building is approximately 138,719 square feet in area and 44’-9” in height.

The project build-out will include the addition of a battery storage and staging area, a processing area, product storage and staging, a drying room, and an associated office space. Table 1 below identifies the occupant classification and use of these proposed build-out areas in accordance with IBC Chapter 3.

Table 1: Occupancy Classification and Use

Use	*Occupancy Classification*
Battery Storage and Staging	Group F-2 (Low-Hazard Factory Use)
Processing Area	Group F-2 (Low-Hazard Factory Use)
Product Storage and Staging	Group S-2 (Low-Hazard Storage)
Drying Room	Group S-2 (Low-Hazard Storage)
Office Space	Group B (Business)

The Maximum Allowable Quantities of storage for Hazardous Materials will not be exceeded in any area of the project, as such there are no Group H occupancies associated with the project.

The building is classified as an unlimited area building and as such will be treated as a non-separated mixed used building in accordance with IBC Section 508.3. The existing Electrical Room 102 is separated from the existing facility by 1-hour fire rated construction. This will be maintained during the build out of the project area. As there are no Group H occupancies, no other rated separations are required for the facility.

5.0 Building Code Requirements

5.1 FIRE SUPPRESSIONS SYSTEMS

The existing facility is fully sprinklered in accordance with IBC Section 903.3.1.1 and NFPA 13. Early Suppression Fast-Response (E.S.F.R.) sprinklers are provided throughout the existing warehouse shell space. The E.S.F.R. automatic sprinkler system was designed under the 2010 edition of NFPA 13 for the hydraulically most remote twelve K-16.8 heads at 52 PSI with a maximum spacing of 100 square feet and 250 gpm of hose stream.

Ordinary Hazard Group I sprinkler coverage (0.15 gpm per square foot over the hydraulically most remote 1,500 square feet) is provided for the existing Electrical room. Extra Hazard Group 2 sprinkler coverage (0.40 gpm per square foot over the hydraulically most remote 2,500 square feet) is provided for the existing Fire Pump Room.

Based on the current plans, high-piled storage over 12-feet is not planned for the facility. If in the future the facility contains storage of materials stored at a height more than 12 feet, the requirements for high-piled storage protected by E.S.F.R. sprinklers found in NFPA 13 Tables 14.4.1 and 15.4.1 will apply.

According to 2016 NFPA 13, Table 14.4.1, the existing E.S.F.R. system will be adequate for ceiling-level only protection of Class I-IV palletized and solid-pile storage up to a height of 35 feet, with a maximum ceiling height of 40 feet.

According to 2016 NFPA 13, Table 15.4.1, the existing E.S.F.R. system will be adequate for ceiling-level only protection of palletized and solid-piled storage (no open-top containers) of cartoned unexpanded or exposed unexpanded Group A plastics up to a height of 35 feet with a maximum ceiling height of 40 feet.

Final racking design and storage arrangements are still under development.

Modification of the sprinkler zoning may be required based on the build out of the space. Drawings for the high-piled storage arrangement and sprinkler system build-out and any modifications will be submitted to the AHJ for review and approval prior to installation beginning.

Automatic Sprinkler system monitoring, and alarms are provided in accordance with IBC Section 903.4.

Portable fire extinguishers are to be installed in areas where flammable or combustible liquids are stored, in use, or dispensed per Section 906.1.3. The portable fire extinguishers shall be selected, installed, and maintained in accordance with Section 906 and NFPA 10.

5.2 FIRE ALARM AND DETECTION

A fire alarm system was not provided for the shell building, and a fire alarm system is not required based on IBC Section 907.

5.3 EMERGENCY ALARM

An emergency alarm system is not required for this facility.

5.4 VENTILATION

Based on the hazardous materials present on site and the occupant classifications of the building, no mechanical ventilation is required for the building.

5.5 SECONDARY POWER

Emergency power shall be provided for exit signs as required by IBC Section 1013.6.3 and for means of egress illumination as required by IBC Section 1008.3.

5.6 SMOKE AND HEAT REMOVAL

Smoke and head vents are not required where E.S.F.R sprinkler systems are provided in accordance with Exception 2 to IBC Section 910.1.

6.0 Hazardous Material Inventory Statement Summary

A project specific Hazardous Materials Inventory Statement (HMIS) is provided as an attachment in Appendix A of this document. No area within the project scope will exceed the MAQ values indicated in IFC Tables 5003.1.1(1) through 5003.1.1(4). The storage, use and handling of hazardous materials in quantities not exceeding the MAQ values indicated in IFC Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with IFC Section 5001 and 5003.

6.1 SYSTEMS, EQUIPMENT AND PROCESSES

Containers, cylinders and tanks for the containment of hazardous materials in the recycle process shall be designed and constructed in accordance with approved standards (IFC Section 5003.2.1).

Piping, tubing, valves and fittings conveying hazardous materials shall be designed and installed in accordance with ASME B31 or other approved standards and shall be in accordance with IFC Sections 5003.2.2.1 and 5003.2.2.2.

6.2 OPERATIONAL REQUIREMENTS

1. Incompatible materials in storage must be separated when the stored materials are in containers having a capacity of more than 5 pounds or 0.5 gallons. (IFC 5003.9.8). Separation can be accomplished by:
    a. Segregating incompatible materials in storage by a distance of not less than 20 feet.
    b. Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches above and to the sides of the stored material.
    c. Storing liquid and solid materials in hazardous material storage cabinets.
2. Appropriate spill clean-up kits should be located in the processing and lab areas for the different types of chemicals.
3. Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled, or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions in the event of fire, leak, or spill. (IFC 5003.9.1).
4. Defective containers, cylinders, and tanks must be removed from service, repaired, or replaced. (IFC Section 5003.2.6).
5. Machinery and equipment utilizing hazardous materials must be braced and anchored in accordance with the seismic design requirements of the IBC for the seismic design category in which the machinery or equipment is classified (IFC Section 5003.2.8).

6. Smoking cannot be allowed within 25 feet of outdoor storage, and in rooms or areas where flammable gases liquids are stored, dispensed, or used in accordance with IFC Section 5003.7.
7. Open flames and high-temperature devices cannot be used in a manner that creates a hazardous condition and must be listed for use with the hazardous materials used/stored (IFC Section 5003.7.2).

6.3 HAZARD COMMUNICATION

Section 5003.5 of the IFC requires entrances to hazardous materials use and storage areas, and associated facilities to be identified by signs to warn emergency responders of unusual or severe hazards that are not directly related to the fire hazard of contents. NFPA 704 regulates the identification and methods of posting the types of hazardous materials to notify emergency responders. NFPA 704 placards are required to be posted in the following locations:

+ Exterior doors or enclosures containing a means of access to the storage area.
+ Each access to a room or area.

Signage is required to be labeled with the following number system, in accordance with NFPA 704, indicating the degree of hazard.

+ 4 – Extreme/Severe Hazard
+ 3 – Serious/High Hazard
+ 2 – Moderate Hazard
+ 1 – Slight Hazard
+ 0 – No Hazard

The final location of the placards shall be approved by the AHJ.

7.0 Hazardous Material Management Plan Summary

The Hazardous Material Management Plan (HMMP) is provided as Appendix B to this report. This section will summarize the requirements of Section 5001.5.1 of the IFC.

7.1 ACCESS TO STORAGE AND USE AREA

Access to the hazardous material rooms/areas will be along the exterior of the facility and inside the facility. The facility has exits along the perimeter of the facility.

7.2 LOCATION OF EMERGENCY EQUIPMENT

The fire sprinkler system is described in Section 5.1 of this report. Location of extinguishers, first aid kits, spill kits, hose reels, and eyewash stations are provided in Appendix A of the HMMP Report.

7.3 LOCATION WHERE LIAISON WILL MEET EMERGENCY RESPONDER

The trained personnel that can assist emergency responders will be stationed at the entrance of the facility.

7.4 FACILITY EVACUATION MEETING POINT

The facility evacuation meeting point is specified on the Appendix A of the HMMP.

7.5 GENERAL PURPOSE OF OTHER AREAS WITHIN THE BUILDING

The general purpose of the areas is shown in the drawings in Appendix B and described in the earlier sections of this report.

7.6 LOCATION OF ALL TANKS

The locations of all aboveground and underground tanks and their appurtenances are shown in Appendix B.

7.7 HAZARD CLASSES IN EACH AREA

There are no Group H occupancies associated with this project.

7.8 LOCATION OF ALL CONTROL AREAS AND GROUP H OCCUPANCIES

There are no Group H occupancies associated with this project. There will only be one control area for the building.

7.9 EMERGENCY EXITS

The facility has emergency exits that discharge directly to the exterior of the building along the perimeter of the building. (Appendix A and B of the HMMP attached)

7.10 MAXIMUM AMOUNT OF EACH MATERIAL STORED OR USED IN EACH AREA

The maximum amount of each material stored and used in each area are shown in the drawing in the HMIS.

7.11 RANGE OF CONTAINER SIZES

The range of container sizes are shown in the drawing in Appendix B and are shown in the HMIS.

8.0 Conclusion

This report provides the summary of the HMIS and HMMP for the Li-Cycle facility. As shown in the report, the facility complies with the hazardous material prescriptive requirements of the IFC and IBC in all areas.

This report is based on the information provided and proposed to be used within this facility. If any changes in hazardous material and quantities occur, it is recommended that the report be re-evaluated.

Submitted by

JENSEN HUGHES, INC.
Prepared by:

Jacob C. Pittman
Associate

Reviewed by:

Expires: 6/30/2022

Tom Barnum, P.E. (AZ)
Senior Fire Protection Engineer

Appendices
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APPENDIX B. HAZARDOUS MATERIAL MANAGEMENT PLAN (HMMP) ..... B
APPENDIX C. SDS SHEET OF TYPICAL LITHIUM-ION BATTERY ..... B

Appendix A. *Hazardous Material Inventory Statement (HMIS)*

Gilbert Fire Department

Hazard Materials Inventory Sheet

Business Name: Li-Cycle

Business Address: 4461 E. Nunneley Road, Gilbert AZ

Contact Person: James Pettingill

Business Phone Number: 1 (613) 449-3772

Emergency Phone Number: 1 (613) 449-3772

Item #	Chemical Name	CAS Number	Physical State	Physical Class	Health Class	Storage Amount	Use Amount Open/Closed	SARA	NFPA 704 H	F	R	O
1	Calcium Hydroxide	1305-62-0	Solid		Corrosive	2205 lbs.	Open	302, 304, 311/312, 313	3	0	1	
2	Crystalline Silica, Quartz	14808-60-7	Solid									
3	Sulfuric Acid (50% wt)	7664-93-9	Liquid		Corrosive	265 gallons	Closed	302, 311/312, 313	3	0	2	

GRAYMONT

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: **HIGH CALCIUM HYDRATED LIME**	**WHMIS – CLASSIFICATION: D2A: MATERIALS CAUSING OTHER TOXIC EFFECTS E: CORROSIVE MATERIAL**

MANUFACTURER'S AND SUPPLIER'S NAME:

GRAYMONT (NB) INC	4634, Route 880, Havelock, New Brunswick, E4Z 5K8.
GRAYMONT (PA) INC.	194, Match Factory Place, Bellefonte, Pennsylvania, 16823
GRAYMONT (QC) INC.	25 – 206, rue De Lauzon, Boucherville, Québec, J4B 1E7.
GRAYMONT (WESTERN CANADA) INC.	#260 – 4311, 12th Street N.E., Calgary, Alberta, T2E 4P9
GRAYMONT WESTERN LIME INC.	206 N. 6th Avenue, West Bend, Wisconsin, 53095
GRAYMONT (WESTERN US) INC.	3950 South, 700 East, Suite 301, Salt Lake City, Utah, 84107
GRAYMONT (WI) INC.	Foot of Hill Avenue, Superior, Wisconsin, 54880

EMERGENCY TEL. No.: (613) 996 – 6666 CANUTEC (Canada) (800) 424 – 9300 CHEMTREC (US)

Chemical Name	Chemical Family	Chemical Formula
Calcium hydroxide	**Alkaline earth hydroxide**	**Complex mixture - mostly $Ca(OH)_2$**
Molecular Weight	Trade Name and Synonyms	Material Use
$Ca(OH)_2$ = 74.096	**Hydrated Lime, Lime, Slaked lime, Lime Putty, Lime Slurry, Milk of Lime, Calcium Hydroxide**	**Neutralization, Flocculation, Stabilization, absorption**

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Concentration (% by weight)	C.A.S. Number	Exposure limits (mg/m^3)					
			OSHA PEL	ACGIH TLV	RSST VEMP	MSHA PEL	NIOSH REL	NIOSH IDLH
(Complex Mixture)	**(% by weight)**		**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 10/40h**	
Calcium hydroxide	**92 to 100**	**1305-62-0**	**15 (T) 5 (R)**	**5**	**5**	**5**	**5**	**N/A**
Crystalline Silica, Quartz	**0 à 0.1 Or 0.1 à 1 (Note 1)**	**14808-60-7**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.025 (R)**	**0.1 (R)**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.05 (R)**	**50**

(**Note 1**): Concentration of crystalline silica in a series of lime products will vary from source to source. It was not detected on some samples (< 0.1% w/w). Therefore two ranges are being disclosed. (**Note 2**): **ACGIH TLV** Version 1973 has been adopted by the Mine Safety Health Administration (**MSHA**) as the regulatory Exposure Standard. (**Note 3**): (**T**) Total Dust; (**R**): Respirable Dust.

SECTION III - PHYSICAL AND CHEMICAL DATA

Physical State Gas ☐ Liquid ☐ Solid ☑	Odor and Appearance **Slight earthy odor – Fine white powder**		Odor Threshold (p.p.m.) **Not applicable**	Specific Gravity **2.3 – 2.4**
Vapor Pressure (mm) **Not applicable**	Vapor Density (Air = 1) **Not applicable**	Evaporation Rate **Not applicable**	Boiling Point (°C) **Not applicable**	Melting Point (°C) **Not applicable**
Solubility in Water (20°C) **0.165g/100g solution**	Volatiles (% by volume) **Not applicable**	pH (25 °C) **Sat. soln $Ca(OH)_2$ 12.45**	Bulk Density (kg/m^3) **320 - 690**	Coefficient of water/oil distribution **Not applicable**

SECTION IV - FIRE OR EXPLOSION HAZARD DATA

Flammability

Yes ☐ No ☑ If yes, under which conditions?

Extinguishing Media

Calcium Hydroxide does not burn. Use extinguishing media appropriate to surrounding fire conditions.

Special Fire Fighting Procedures

Not applicable

Flash point (° C) and Method **Not applicable**	Upper flammable limit (% by volume) **Not applicable**	Lower flammable limit (% by volume) **Not applicable**
Auto Ignition Temperature (°C) **Not applicable**	TDG Flammability Classification **Non-flammable**	Hazardous Combustion Products **None**

Dangerous Combustion Products **None**

EXPLOSION DATA

Sensitivity to Chemical Impact **Not applicable**	Rate of Burning **Not applicable**	Explosive Power **Not applicable**	Sensitivity to Static Discharge **Not applicable**

SECTION V - REACTIVITY DATA

Chemical Stability		
Yes ☑ No ☐	If no, under which conditions?	**Absorbs carbon dioxide in the air to form calcium carbonate.**
Incompatibility to other substances		
Yes ☑ No ☐	If so, which ones?	**Boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorus pentoxide; and acids (violent reaction with generating heat and possible explosion in confined area).**
Reactivity		
Yes ☑ No ☐	If so, under which conditions?	**Reacts violently with strong acids. Reacts chemically with acids and many other compounds and chemical elements to form calcium based compounds. Explosive when mixed with nitro organic compounds.**
Hazardous Decomposition Products		**Thermal decomposition at 540°C will produce calcium oxide and water.**
Hazardous Polymerization Products		**Will not occur.**

SECTION VI - TOXICOLOGICAL PROPERTIES

Route of Entry

☑ Skin Contact ☐ Skin Absorption ☑ Eye Contact ☑ Acute Inhalation ☐ Chronic Inhalation ☑ Ingestion

Effects of Acute Exposure to Product

Skin	**Severe irritation of mucous and skin, removes natural skin oils.**
Eyes	**Severe eye irritation, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period. Eye irritation data: Eye-Rabbit-10mg/ 24 h – Severe.**
Inhalation	**If inhaled in form of dust, irritation of breathing passages, cough, sneezing.**
Ingestion	**If ingested: pain, vomiting blood, diarrhea, collapse, drop in blood pressure (indicates perforation of esophagus or stomach).**

Effects of Chronic Exposure to Product:

Contact dermatitis. Following repeated or prolonged contact, this product can cause redness, desquamation and fissures. This product may contain trace amounts of crystalline silica. Excessive inhalation of respirable crystalline silica dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis.

LD_{50} of Product (Specify Species and Route) **7340 mg/kg (Rat, Oral)** **7300 mg/kg (Mouse, Oral)**	Irritancy of Product **Severe to moist tissues**	Exposure limits of Product **Unavailable**
LC_{50} of Product (Specify Species) **Unavailable**	Sensitization to Product **None**	Synergistic materials **None reported**

SECTION VI - TOXICOLOGICAL PROPERTIES (Cont'd)

☑ Carcinogenicity ☐ Reproductive effects ☐ Tératogenicity ☐ Mutagenicity

Calcium Hydroxide is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IARC. It may, however, contain trace amounts of Crystalline Silica listed carcinogens by these organizations.

Crystalline Silica, which inhaled in the form of quartz or crystobalite from occupational sources, is classified by IARC as carcinogenic to humans. (Group 1)

Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline Silica is listed as a chemical known to the State to cause cancer.

NIOSH considers crystalline silica to be potential occupational carcinogen as defined by the OSHA carcinogen policy [29 CFR 1990]. (Ca).

NTP lists respirable Crystalline Silica as known to be human carcinogens based on sufficient evidence of carcinogenicity in humans. (K).

ACGIH lists respirable Crystalline Silica (quartz) as suspected human carcinogen. (A2).

DFG lists respirable Crystalline Silica as a substance that causes cancer in man (1)

RSST lists respirable Crystalline Silica (quartz) as suspected human carcinogen.

SECTION VII - PREVENTIVE MEASURES

Personal Protective Equipment (PPE)	**Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.**
Gloves (Specify)	**Gauntlets Cuff style.**
Respiratory (Specify)	**Respirator Recommendations for Calcium Hydroxide: Not available.** **Respirator Recommendations for Calcium Oxide: NIOSH approved respirator.** **Up to 10 mg/m^3: (APF = 5) Any quarter-mask respirator.** **Up to 20 mg/m^3: (APF = 10) Any particulate respirator equipped with an N95, R95 or P95 filter except quarter-mask respirator. Any supplied-air respirator.** **Up to 25 mg/m^3: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode. Any powered, air purifying respirator with a high-efficiency particulate filter.**
Eyes (Specify)	**ANSI, CSA or ASTM approved safety glasses with side shields. Tight fitting dust goggles should be worn when excessive (visible) dust conditions are present. Do not wear contact lenses without tight fitting goggles when handling this chemical.**
Footwear (Specify)	**Resistant to caustics.**
Clothing (Specify)	**Fully covering skin. Remove when wet or contaminated. Change daily.**
Other (Specify)	**Evaluate degree of exposure and use PPE if necessary. After handling lime, employees must shower. If exposed daily, use oil, Vaseline, silicone base crème etc. to protect exposed skin, particularly neck, face and wrists.**

Engineering Controls (e.g. ventilation, enclosed process, specify)

Enclose dust sources; use exhaust ventilation (dust collector) at handling points, keep levels below Max. Concentration Permitted.

SECTION VII - PREVENTIVE MEASURES (Cont'd)

Leak and Spill Procedure

Limit access to trained personnel. Use industrial vacuums for large spills. Ventilate area.

Waste Disposal

Transport to disposal area or bury. Review Federal, Provincial and local Environmental regulations.

Handling Procedures and Equipment

Avoid skin and eye contact. Minimize dust generation. Wear protective goggles and in cases of insufficient ventilation, use NIOSH approved dust respirator. An eye wash station and safety shower should be readily available where this material or its water dispersions are used. Contact lenses should not be worn when working with this chemical.

Storage Requirements

Keep tightly closed containers in a cool, dry and well-ventilated area, away from acids. Keep out of reach of children.

Special Shipment Information

Calcium Hydroxide is neither regulated by the Transportation of Dangerous Goods (TDG) Regulations (Canada) nor by the Hazardous Materials Regulations (USA).

SECTION VIII - FIRST AID MEASURES

Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Use a brush, cloth or gloves. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Consult a physician if exposed area is large or if irritation persists.

Eyes

Immediately rinse contaminated eye(s) with gently running lukewarm water (saline solution is preferred) for 15 to 20 minutes. In the case of an embedded particle in the eye, or chemical burn, as assessed by first aid trained personnel, contact a physician.

Inhalation

Move source of dust or move victim to fresh air. Obtain medical attention immediately. If victim does not breathe, give artificial respiration.

Ingestion

If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

General Advise

Consult a physician for all exposures except minor instances of inhalation.

SECTION IX - REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 (SARA Title III). / The Emergency Planning and "Community Right-to-Know" Act (EPCRA). / Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). / Resource Conservation and Recovery Act (**RCRA**).

Component Calcium Hydroxide has been reviewed against the following regulatory listings:

- **SARA Section 302 – Emergency Planning Notification. Extremely Hazardous Substances (EHS) List and Threshold Planning Quantity (TPQ). (40 CFR, Part 355, Section 30) : Not listed.**
- **SARA Section 304 – Emergency Release Notification. Extremely Hazardous Substances (EHS) and Reportable Quantity (RQ) List. (40 CFR, Part 355, Section 40) : Not listed.**
- **SARA Section 311/312 – Hazard Categories (40 CFR, Part 370) : This product is regulated under CFR 1910.1200 (OSHA Hazard Communication) as Immediate (Acute) Health Hazards – Irritant.**
- **SARA Section 313 – Toxics Release Inventory (TRI). Toxic Chemical List (40 CFR, Part 372). Not listed.**
- **CERCLA – Hazardous Substance (40 CFR, Part 302): Not listed in Table 302.4.**
- **RCRA – Hazardous Waste Number (40 CFR, Part 261, Subpart D): Not listed.**
- **RCRA – Hazardous Waste Classification (40 CFR, Part 261, Subpart C): Not classified.**

CWA 311. - Clean Water Act List of Hazardous Substances.

Calcium Hydroxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400)

California Proposition 65.

Component Calcium Hydroxide does not appear on the above regulatory listing. This product may contain small amounts of crystalline silica. Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline silica is listed as a chemical known to the State to cause cancer.

Transportation - Hazardous Materials Regulations (USA) & Transportation of Dangerous Goods (TDG) Regulations (Can).

Calcium Hydroxide does not appear on the above regulatory listings

Toxic Substances Control Act (TSCA).

All naturally occurring components of this product are automatically included in the USEPA TSCA Inventory List per 40 CFR 710.4 (b). All other components are listed on the USEPA TSCA Chemical Substances Inventory. Calcium Hydroxide is subject to inventory update reporting (IUR).

Canadian Environmental Protection Act (CEPA) – Substances Lists (DSL/NDSL).

Calcium Hydroxide is specified on the public Portion of the Domestic Substances List (DSL).

ANSI/NSF 60 - Drinking Water Treatment Additives.

Hydrated Lime has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water (in accordance with Standard ANSI/NSF 60). For a list of classified products, refer to Underwriters Laboratories Inc.'s Online Certifications Directory.

FDA - U.S. Food and Drug Administration, Department of Health and Human Services.

Calcium Hydroxide has been determined as "Generally Recognized As Safe" (GRAS) by FDA. See 21CFR184.1205. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

SECTION X - OTHER INFORMATION

Hazardous Materials Identification System (U.S.)

National Fire Protection Association (U.S.) NFPA 704

WHMIS – Classification:	WHMIS – Classification:
"E" Corrosive Materials.	**"D2A" Materials causing other toxic effects.**
Symbol: 	Symbol: 

Additional Information/Comments:

The technical data contained herein is given as information only and is believed to be reliable. GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.

Sources Used:

NFPA, NLA, TDG, CSST, RSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP, HSDB, EPA SRS, RTECS, DFG, Chemistry and Technology of Lime and Limestone (John Wiley and Sons, Inc.), Lime and Limestone (WILEY-VCH).

SECTION XI - PREPARATION INFORMATION

Prepared by:	Telephone number:	Date :
GRAYMONT (QC) INC. **Quality Assurance & Technical Services**	**(450) 449-2262**	**May 2012**

An electronic version of this MSDS is available at: www.graymont.com under the PRODUCTS section.

Safety Data Sheet

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Sulfuric Acid, 50% v/v

Product Number: C7306200

Other Identifying Product Numbers: 7-30620, 7-30620-1, 7-30620-3, 7-30620-L, C7306200-10F, C7306200-2.5D1, C7306200-500A

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Reagents Inc.

Address: 4746 Sweden Road
Charlotte, NC 28224 USA

Telephone: 800-732-8484

1.4. Emergency Telephone Number (24 hr)

CHEMTREC (USA) 800-424-9300

CHEMTREC (International) 1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture (in accordance with OSHA HCS 29 CFR 1910.1200)

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

Hazard Class	Category	Hazard Statement	Precautionary Statements
Skin Corrosion / Irritation	Category 1	H314	P260, P264, P280, P301+P330+P331, P303+P361+P353, P363, P304+P340, P310, P321, P305+P351+P338, P405, P501
Eye Damage / Irritation	Category 1	H318	P280, P305+P351+P338, P310
Corrosive to Metals	Category 1	H290	P234, P390, P406

2.2. GHS Label Elements

Pictograms:

Safety Data Sheet

Signal Word: **Danger**

Hazard Statements:

Hazard Number	Hazard Statement
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.

Precautionary Statements:

Precautionary Number	Precautionary Statement
P234	Keep only in original container.
P260	Do not breathe dust, fumes or mist.
P264	Wash arms, hands and face thoroughly after handling.
P280	Wear protective gloves and eye protection.
P301+P330+P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P406	Store in corrosive resistant container with a resistant inner liner.

2.3. WHMIS Classification

WHMIS classification is not included based on the recommended option (Option 4) found in the Canada Gazette Part II, Vol. 149, No.3, page 458

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Sulfuric Acid	H_2SO_4	98.07 g/mol	7664-93-9	62.19%
Water	H_2O	18.01 g/mol	7732-18-5	37.81%

Safety Data Sheet

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Eye contact causes tissue damage and blindness.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Skin contact causes burns, blistering, local necrosis, and membrane ulceration. Burns may be 2nd or 3rd degree.

Ingestion: IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Dilute immediately with water or milk. Vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Call a physician immediately.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Corrosive liquid. Causes severe burns. Eye contact causes tissue damage and blindness. Ingestion causes corrosion of the mucosa of the mouth, throat and esophagus with stomach discomfort and pain. If ingested, dilute with large quantity of water. Do not induce vomiting. Call a physician. Wash areas of contact with plenty of water for at least 15 minutes. If possible, wipe off areas of contact with dry cloth before flushing with water, as water contact will generate heat. EYE CONTACT: Eye contact causes tissue damage and blindness. SKIN CONTACT: Skin contact causes burns, blistering, local necrosis, and membrane ulceration. Burns may be 2nd or 3rd degree. CHRONIC EFFECTS / CARCINOGENICITY: May affect the skin, liver, kidneys and blood.

4.3. Medical Attention or Special Treatment Needed

Immediately call a POISON CENTER or physician.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Dry chemical, foam, or carbon dioxide. Reacts with water producing heat and toxic fumes.

5.2. Specific Hazards Arising from the Substance or Mixture

Not combustible. Strong dehydrating agent, which may cause ignition of finely divided materials on contact. Reaction with metals may produce hydrogen gas. Oxides of sulfur may be produced in fire.

5.3. Special Protective Equipment for Firefighters

Wear special protective clothing and positive pressure self-contained breathing apparatus. Butyl rubber, natural rubber, Neoprene, polyethylene, polyvinyl chloride, Teflon, Viton, or Saranex barrier recommended.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear protective gloves and eye protection.

6.2. Cleanup and Containment Methods and Materials

Keep water away from release. Stop or control the leak, if this can be done without undue risk. Control runoff and isolate discharged material for proper disposal.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

Store in corrosive resistant container with a resistant inner liner. As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage. Do not mix with bases. Contact with water will generate heat.

SECTION 8: Exposure Controls / Personal Protection

8.1. Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Sulfuric Acid (7664-93-9)	TWA	USA	1 mg/m^3 TWA	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)
Sulfuric Acid (7664-93-9)	TLV-TWA	USA	0.2 mg/m^3 TWA (thoracic fraction)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Wear protective gloves and eye protection. Chemical resistant gloves.

Eye Protection: Wear protective gloves and eye protection. Safety glasses or goggles.

8.3. Personal Protective Equipment

Wear protective gloves and eye protection. Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance:	Colorless liquid
Physical State:	Liquid
Odor:	Odorless
Odor Threshold:	Not applicable.
pH:	< 1
Melting/Freezing Point:	Approximately -35°C
Initial Boiling Point /Range:	Approximately 125°C -
Flash Point:	Not applicable.
Evaporation Rate:	Data not available.
Flammability:	Data not available.
Flammability/Explosive Limits:	Data not available.
Vapor Pressure:	Data not available.
Vapor Density:	Data not available.
Relative Density:	1.49
Solubility:	Miscible
Partition Coeffieient (n-Octanol/Water):	Data not available.
Auto-Ignition Temperature:	Not applicable.
Decomposition Temperature:	Data not available.
Viscosity:	Data not available.
ExplosiveProperties:	Data not available.
Oxidizing Properties:	Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Keep only in original container. Organics, chlorates, carbides, fulminates, picrates, alkalines, reducing agents, nitrates, Acetic Acid, oxidizing agents,

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rat: 2140 mg/kg (Sulfuric Acid), details of toxic effects not reported other than lethal dose value. LC50, Inhalation, Rat: (Sulfuric Acid) 510 mg/m3/2H, No toxic effect noted.

Skin Corrosion and Irritation:

Causes severe skin burns and eye damage. Do not breathe dust, fumes or mist. Wash arms, hands and face thoroughly after handling. Wear protective gloves and eye protection. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Wash contaminated clothing before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Serious Eye Damage and Irritation:

Causes serious eye damage. Wear protective gloves and eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land - Department of Transportation (DOT, United States of America)

UN Number: UN1830

Proper Shipping Name: Sulphuric Acid Solution

Hazard Class: 8

Packing Group: II

Hazard Placard Labels:

Safety Data Sheet

14.2. Transportation by Air - International Air Transport Association (IATA)

UN Number: UN1830

Proper Shipping Name: Sulphuric Acid Solution

Hazard Class: 8

Packing Group: II

Hazard Placard Labels:

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Sulfuric Acid (CAS # 7664-93-9): 1000 lb EPCRA RQ

Sulfuric Acid (CAS # 7664-93-9): 1000 lb TPQ

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Sulfuric Acid (CAS # 7664-93-9): 1000 lb final RQ; 454 kg final RQ

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Sulfuric Acid (CAS # 7664-93-9): 1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

15.5. Massachusetts Right-to-Know Substance List

Sulfuric Acid (CAS # 7664-93-9): Extraordinarily hazardous

15.6. Pennsylvania Right-to-Know Hazardous Substances

Sulfuric Acid (CAS # 7664-93-9): Environmental hazard

Sulfuric Acid (CAS # 7664-93-9): Present

Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Sulfuric Acid (CAS # 7664-93-9): carcinogen; corrosive; reactive - second degree

Sulfuric Acid (CAS # 7664-93-9): sn 1761

Sulfuric Acid (CAS # 7664-93-9): SN 1761 TPQ: 500 lb

15.8. California Proposition 65

Sulfuric Acid (CAS # 7664-93-9): carcinogen, initial date 3/14/03

Safety Data Sheet

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Sulfuric Acid (CAS # 7664-93-9): Present

Water (CAS # 7732-18-5): Present

15.10. United States of America Toxic Substances Control Act (TSCA) List

Sulfuric Acid (CAS # 7664-93-9): Present

Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Not listed.

SECTION 16: Other Information

16.1. Full Text of Hazard Statements and Precautionary Statements

May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage.

Keep only in original container. Do not breathe dust, fumes or mist. Wash arms, hands and face thoroughly after handling. Wear protective gloves and eye protection.

IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.

Store locked up. Store in corrosive resistant container with a resistant inner liner.

Dispose of contents in accordance with local, state, federal and international regulations.

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.

Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.

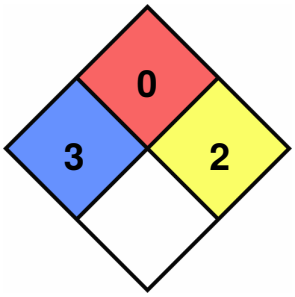
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.

Biohazardous Infectious Materials Hazard Class: Not Applicable.

Safety Data Sheet

16.3. National Fire Protection Association (NFPA) Rating

Health: 3
Flammability: 0
Reactivity: 2
Special Hazard:



16.4. Document Revision

Last Revision Date: 5/30/2018

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty, expressed or implied, is made and REAGENTS, INC. assumes no legal responsibility or liability whatsoever resulting from its use.

Appendix B. *Hazardous Material Management Plan (HMMP)*

SPOKE 3: HAZARDOUS MATERIALS MANAGEMENT PLAN

4461 E. Nunneley Rd, Gilbert AZ

May 2021

LI-CYCLE INCORPORATED

100 Latona Road, Building 350
Rochester, NY 14615, United States
Tel. +1 877 LI-CYCLE • www.li-cycle.com

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1. Facility Information

Li-Cycle will recover materials from lithium-ion ("li-ion") batteries at the Gilbert Commerce Gateway Centre, located at 4461 E. Nunneley Rd, Gilbert, AZ. The facility ("Spoke 3") houses Li-Cycle's Safe Size Reduction™ Technology, where li-ion batteries are processed through a mechanical size-reduction process to create an intermediate products including, black mass concentrate, shred plastics, and metal foils. The black mass concentrate will be staged at Li-Cycle's storage facility in the East Valley prior to transport to Li-Cycle's Hub facility in Rochester, NY, where the concentrate is chemically refined. Other products from the Spoke 3 operation will be staged at Li-Cycle's storage facility before being sent to external third parties for resource recovery. All materials recovered in Li-Cycle's operations are containerized in bulk bags or bins.

2. Hazardous Materials Management Plan (HMMP)

The purpose of this document is to outline the operational information required for the Spoke 3 facility. The following sections summarize the required information requested under the HMMP.

A. Access to Each Storage and Use Area

Refer to Appendix A.

B. Location of Emergency Equipment

Refer to Appendices A and B.

C. Emergency Responders Meeting Point Location

(1) provides the location where personnel within the plan will liaise to meet with emergency responders.
(2) provides the facility's evacuation muster point.

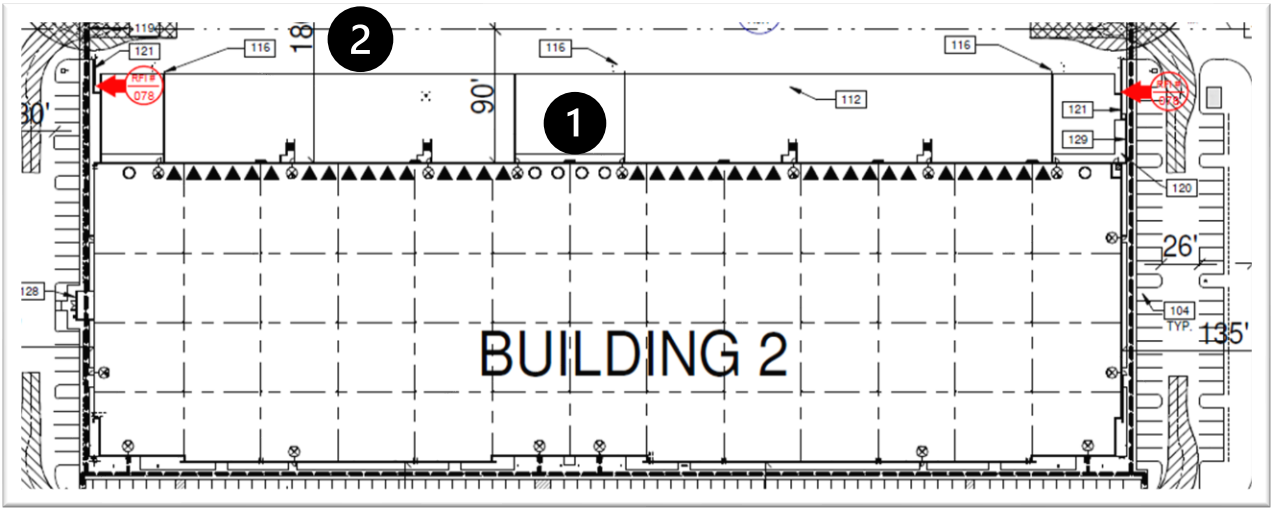

Figure 1: Meeting Point Locations

D. Facility Evacuation Meeting Point Locations

Refer to Figure 1 above.

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E. General Purpose of Areas in the Building

Refer to Appendix C.

F. Hazard Classes in Each Area

The below hazard classes and occupancy classes were assessed based on the Spoke 2 Li-Cycle Facility in Rochester, NY and signed and stamped by a New York State Architect (Shown in Appendix C).

- Battery Storage and Staging: F-2 (Low-Hazard Factory Use)
- Processing Area: F-2 (Low-Hazard Factory Use)
- Product Storage and Staging: S-2 (Low-Hazard Storage)
- Drying Room: S-2 (Low-Hazard Storage)
- Office Space: B (Business)

G. Locations of all control areas and Group H Occupancies

There are no control areas or Group H Occupancies associated with the Spoke 3 Facility.

H. Locations of all Above Ground and Underground Tanks and their Appurtenances

There are no underground tanks associated with the Spoke 3 Facility. The estimated locations of above ground tanks are shown below in Figure 2.

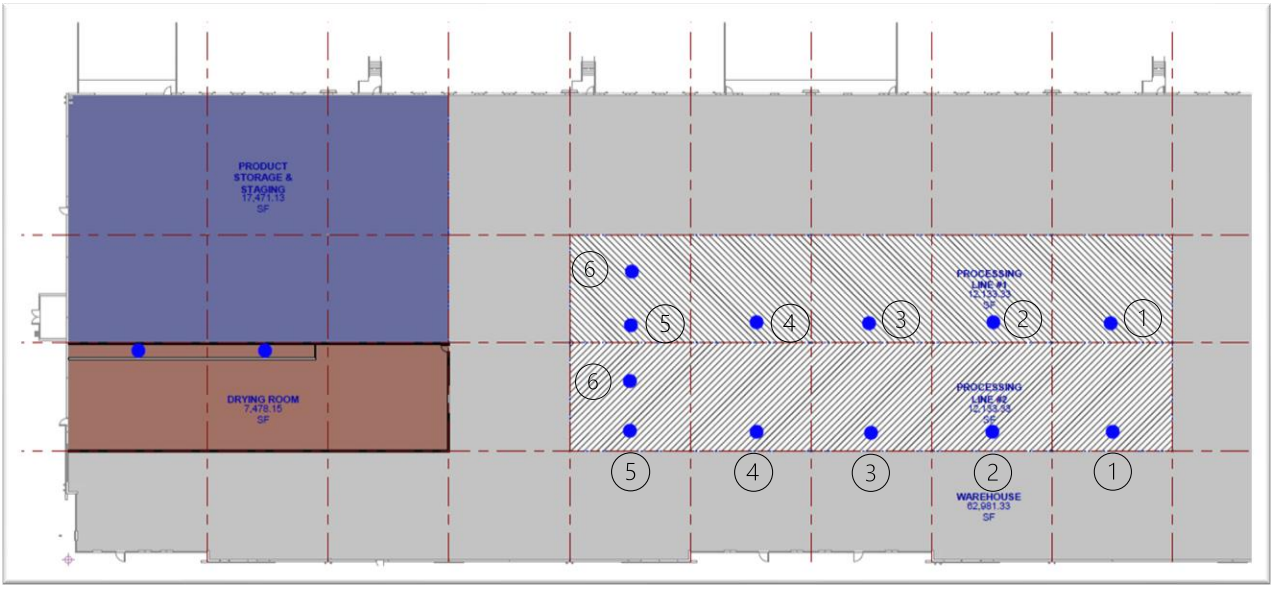

Figure 2: Tank Locations

The Table below summarizes the tank details used for Li-Cycle's processing lines. Note, there will be two of each tank in the facility.

Table 1: List of Tanks

Tank	Height (ft)	Diameter (ft)	Volume (gal)
1	17	17	28,865
2	9	9	4,283
3	9	5	1,322
4	9	9	4,283
5	10	11.5	7,770
6	10	11.5	7,770

The solution used throughout the process is a water-based solution with a pH of 7-9 and is used as a working solution to assist in the process and prevent dusting. All solutions are retained within the process.

Tanks will have a containment berm sized to contain the tanks within the processing lines. The two tanks shown in the drying room will be IBC totes used to collect solution expelled from the end products during the air-drying process. There will also be a containment berm surrounding the drying racks, including the IBC totes. These berms will be sealed and have the volume equal to the sum of the included tank volumes, including a 10% factor of safety on the largest tank and an additional safety factor of 10% for the entire system.

I. Emergency Exit Locations

Refer to Appendix A.

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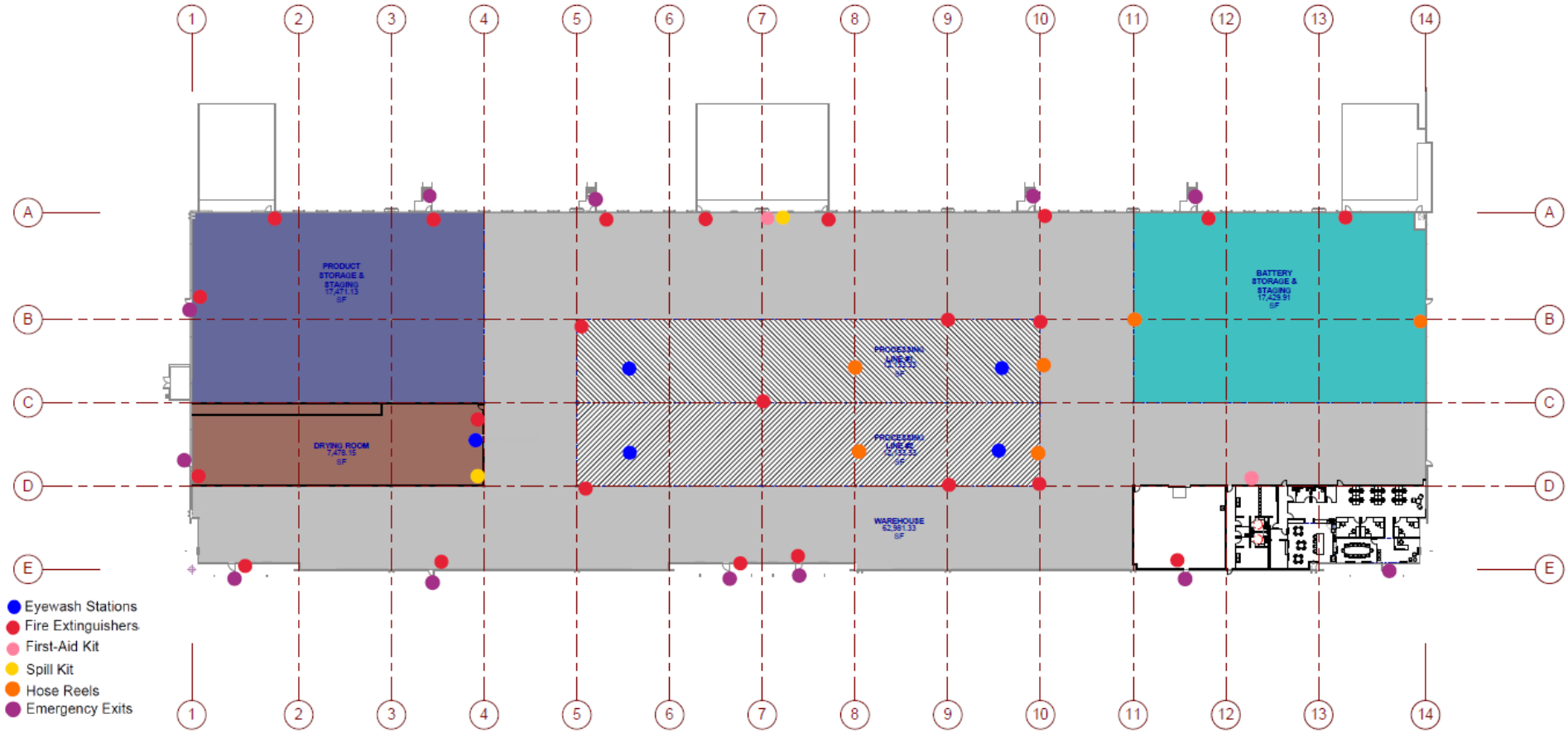
Appendix A: Emergency Equipment Location – Plant Floor



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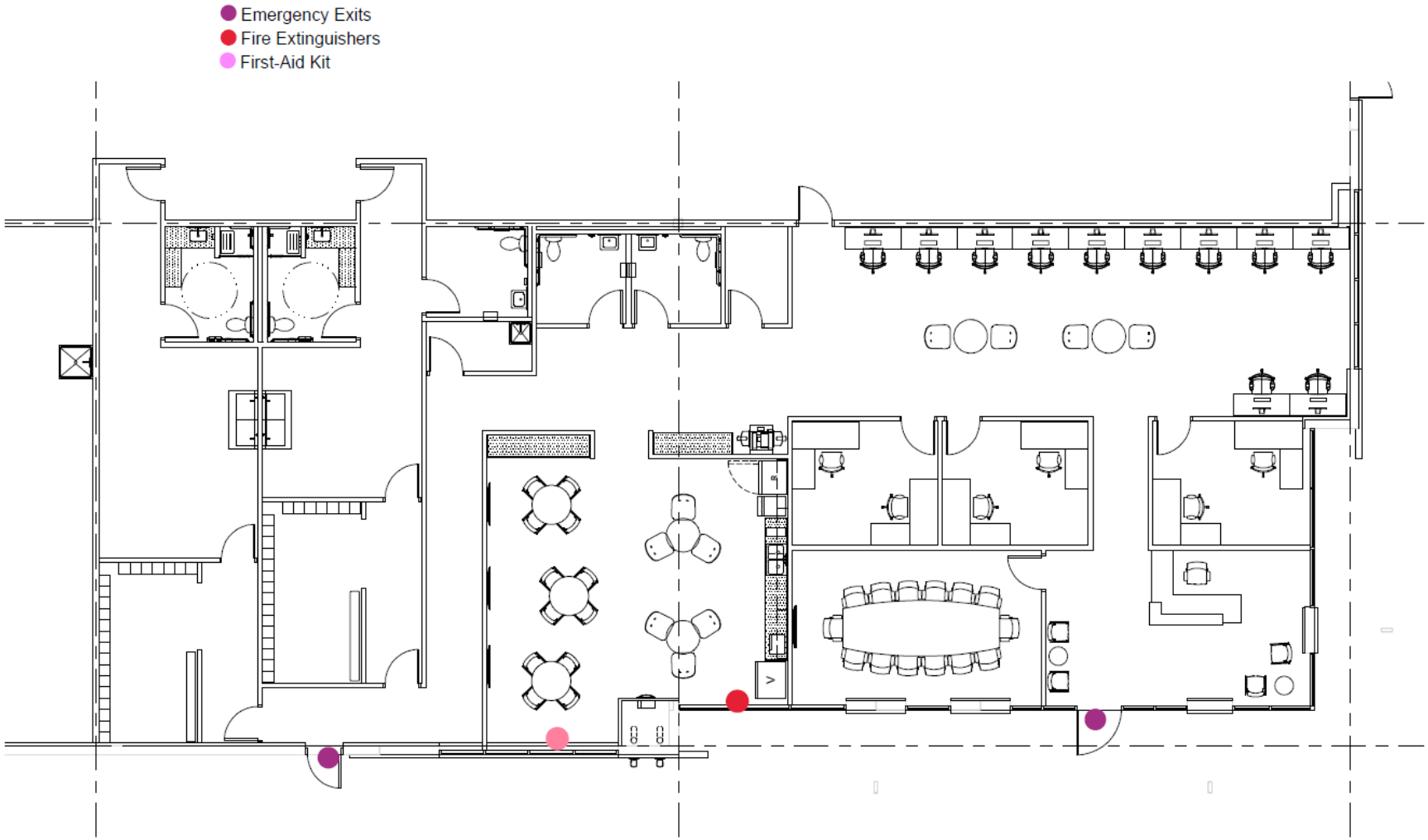
Appendix B: Emergency Equipment Location – Office



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Appendix C: Signed Occupancy Classification

BUILDING DATA & CODE REVIEW

PROJECT NAME:	LI-CYCLE		
EWBR PROJECT NUMBER:	20021.00		
PREPARED BY:	JG	CHECKED BY:	
DATE:	3/6/2020	DATE:	

BUILDING DATA & CODE SUMMARY - NEW YORK STATE UNIFORM CODE
WITH REFERENCE TO: INTERNATIONAL BUILDING CODE 2015 AND 2017 UNIFORM CODE SUPPLEMENT

OCCUPANCY CLASSIFICATION: (Chapter 3)

☐ SINGLE
☒ MIXED OCCUPANCY ☐ SEPARATED ☒ NON-SEPARATED ☐ COMBINATION OF BOTH

IF SEPARATED, FIRE RESISTANCE RATING OF FIRE BARRIER (Table 508.4): _____ HR

OCCUPANCY CLASSIFICATION(S): F-1

USE(S): LITHIUM RECYCLING

CONSTRUCTION CLASSIFICATION : (Chapter 6) I-B

AUTOMATIC SPRINKLER SYSTEM PROVIDED: ☐ YES ☐ NO

NFPA STANDARD: ☒ 13 ☐ 13R ☐ 13D

REHABILITATION OF EXISTING STRUCTURES
2015 INTERNATIONAL EXISTING BUILDING CODE - CLASSIFICATION OF WORK
Refer to Code Compliance Drawings for location of Work Areas as defined in Chapter 5 of the 2015 International Existing Building Code

COMPLIANCE PATH METHOD
☐ PRESCRIPTIVE METHOD
☒ WORK AREA METHOD
☐ PERFORMANCE METHOD

☐ REPAIR	(Chapter 6)
☒ ALTERATION - LEVEL 1	(Chapter 7)
☒ ALTERATION - LEVEL 2	(Chapter 8)
☐ ALTERATION - LEVEL 3	(Chapter 9)
☒ CHANGE OF OCCUPANCY	(Chapter 10)

FORMER OCCUPANCY CLASSIFICATION: F-1
NEW OCCUPANCY CLASSIFICATION: F-1, S-1, B, A-3
PARTIAL CHANGE OF OCCUPANCY: ☒ YES ☐ NO
IF YES: ☐ SEPARATED ☒ NOT SEPARATED

HEIGHT & AREA - ACTUAL: (Chapter 5)

BUILDING HEIGHT	HEIGHT IN FEET		HEIGHT IN STORIES	
EXISTING	55	ft	2	

BUILDING AREA	WORK AREA		FLOOR AREA	ADDITION	TOTAL
FIRST	21,122	sf	sf	sf	sf
SECOND	31,538	sf	sf	sf	sf
MEZZANE	15,078	sf	sf	sf	sf
TOTAL (NOT INCLUDING MEZZANINE)	67,738	sf	sf	sf	sf

ALLOWABLE AREA SUMMARY

LEVEL	OCCUPANCY CLASSIFICATION	ACCESSORY	MIXED USE PROVISIONS (508) SEPARATED	NON-SEPARATED	RATIO ACTUAL / ALLOWABLE
1	F-2	X		X	
2	F-2	X		X	
2	S-2	X		X	
MEZZ	B	X		X	
MEZZ	F-2	X		X	

ALLOWABLE AREA COMPLIES? ☒ YES ☐ LESS THAN 3 ☐ LESS THAN 4

ALLOWABLE HEIGHT SUMMARY

LEVEL	OCCUPANCY CLASSIFICATION	ALLOWABLE HEIGHT STORIES	ALLOWABLE HEIGHT FEET	ACTUAL HEIGHT STORIES	ACTUAL HEIGHT FEET	COMPLIANT YES	COMPLIANT NO
1	F-2	12	180	2	55	X	
2	F-2	12	180	2	55	X	
2	S-2	12	180	2	55	X	
MEZZ	B	12	180	2	55	X	
MEZZ	F-2	12	180	2	55	X	

SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY: (Chapter 4)

- ☐ Covered mall and open mall buildings [402]
- ☐ High-rise buildings [403] – Occupied floors > 75 feet
- ☐ Atriums [404]
- ☐ Underground buildings [405]
- ☐ Motor vehicle related occupancies [406]
- ☐ Group I-2 (health care) [407]
- ☐ Group I-3 (correctional or detention) [408]
- ☐ Motion picture projection rooms [409]
- ☐ Stages, platforms, technical production areas [410]
- ☐ Special amusement buildings [411]
- ☐ Aircraft related occupancies [412]
- ☒ Combustible storage [413]
- ☐ Hazardous materials [414]
- ☐ Group H1 through H5 [415]
- ☐ Application of flammable finishes [416]
- ☐ Drying rooms [417]
- ☐ Organic coatings [418]
- ☐ Live/Work units [419]
- ☐ Group I-1, R-1, R-2, R-3, R-4 [420]
- ☐ Hydrogen fuel gas rooms [421]
- ☐ Ambulatory care facilities [422]
- ☐ Storm shelters [423]
- ☐ Children's play structures [424]
- ☐ Hyperbaric facilities [425]
- ☐ Combustible dusts, grain processing & storage [426]

FIRE PROTECTION SYSTEMS: (Chapter 9)

Indicate size and location of fire areas on code compliance drawing.

FIRE PROTECTION SYSTEM	REQUIRED	PROVIDED	SECTION
AUTOMATIC SPRINKLER	Y	Y	(903)
ALTERNATIVE AUTO FIRE EXT	N	N	(904)
STANDPIPE	N	Y	(905)
PORTABLE FIRE EXTINGUISHER	Y	Y	(906)
FIRE ALARM & DETECTION	Y	Y	(907)
EMERGENCY ALARM	N	N	(908)
SMOKE CONTROL SYSTEM	N	N	(909)
SMOKE & HEAT REMOVAL	N	N	(910)
FIRE COMMAND CENTER	N	N	(911)
FIRE DEPARTMENT CONNECTIONS	Y	Y	(912)
FIRE PUMPS	N	N	(913)
EMERGENCY RESPONDER SAFETY	N	N	(914)
CARBON MONOXIDE DETECTION	Y	Y	(915)
EMERGENCY RESPONDER RADIO	N	N	(916)

MEANS OF EGRESS: (Chapter 10)

MEANS OF EGRESS ELEMENT	REQUIRED	PROVIDED	SECTION
NUMBER OF EXITS	2	3	(Table 1006.3.1)
EXIT ACCESS TRAVEL DISTANCE	400'	269'	(Table 1017.2)
DEAD-END LIMIT	20'	0'	(1020.4)
COMMON PATH OF TRAVEL LIMIT	100'	22'	(1006.2.1)

PLUMBING FIXTURE REQUIREMENTS (EXISTING STRUCTURES):

DOES THE CALCULATED OCCUPANT LOAD OF THE STORY INCREASE BY GREATER THAN 20% AS A RESULT OF THE ALTERATION? (FOR LEVEL 2 AND LEVEL 3 ALTERATIONS) (IF NO, THE QUANTITY OF PLUMBING FIXTURES ON THE WORK AREA FLOOR LEVEL SHALL NOT BE REQUIRED TO BE REVIEWED AND/OR INCREASED.) (IEBC 2015 810.1) ☒ YES ☐ NO ☐ N/A

DOES THE CHANGE OF OCCUPANCY RESULT IN A NEW OCCUPANCY WHICH IS SUBJECT TO INCREASED OR DIFFERENT PLUMBING FIXTURE REQUIREMENTS OR TO INCREASED WATER SUPPLY REQUIREMENTS IN ACCORDANCE WITH THE PLUMBING CODE. (IF NO, THE QUANTITY OF PLUMBING FIXTURES ON THE WORK AREA LEVEL SHALL NOT BE REQUIRED TO BE REVIEWED AND/OR INCREASED.) (IEBC 2015 1010.1) ☐ YES ☒ NO ☐ N/A

ACCESSIBILITY (EXISTING STRUCTURES):

DOES THE ALTERATION WORK AREA AFFECT THE ACCESSIBILITY TO OR CONTAIN AN AREA OF PRIMARY FUNCTION. (IEBC 2015 705.1 & 705.2) ☐ YES ☒ NO ☐ N/A

ARE ANY OF THE EXCEPTIONS TO 705.2 APPLICABLE TO THE SCOPE OF WORK?
1. COST OF ACCESSIBLE UPGRADES WOULD EXCEED 20% OF THE CONSTRUCTION.
2. ALTERATION LIMITED TO MECHANICAL, ELECTRICAL, TELECOMM OUTLETS, SIGNS.
3. ALTERATION LIMITED TO MECHANICAL, ELECTRICAL FIRE PROTECTION, HAZ MAT.
4. PRIMARY PURPOSE OF ALTERATION IS INCREASING THE ACCESSIBILITY.
5. ALTERATION LIMITED TO TYPE B DWELLING AND SLEEPING UNITS. (IEBC 2015 705.1 & 705.2) ☐ YES ☐ NO ☐ N/A

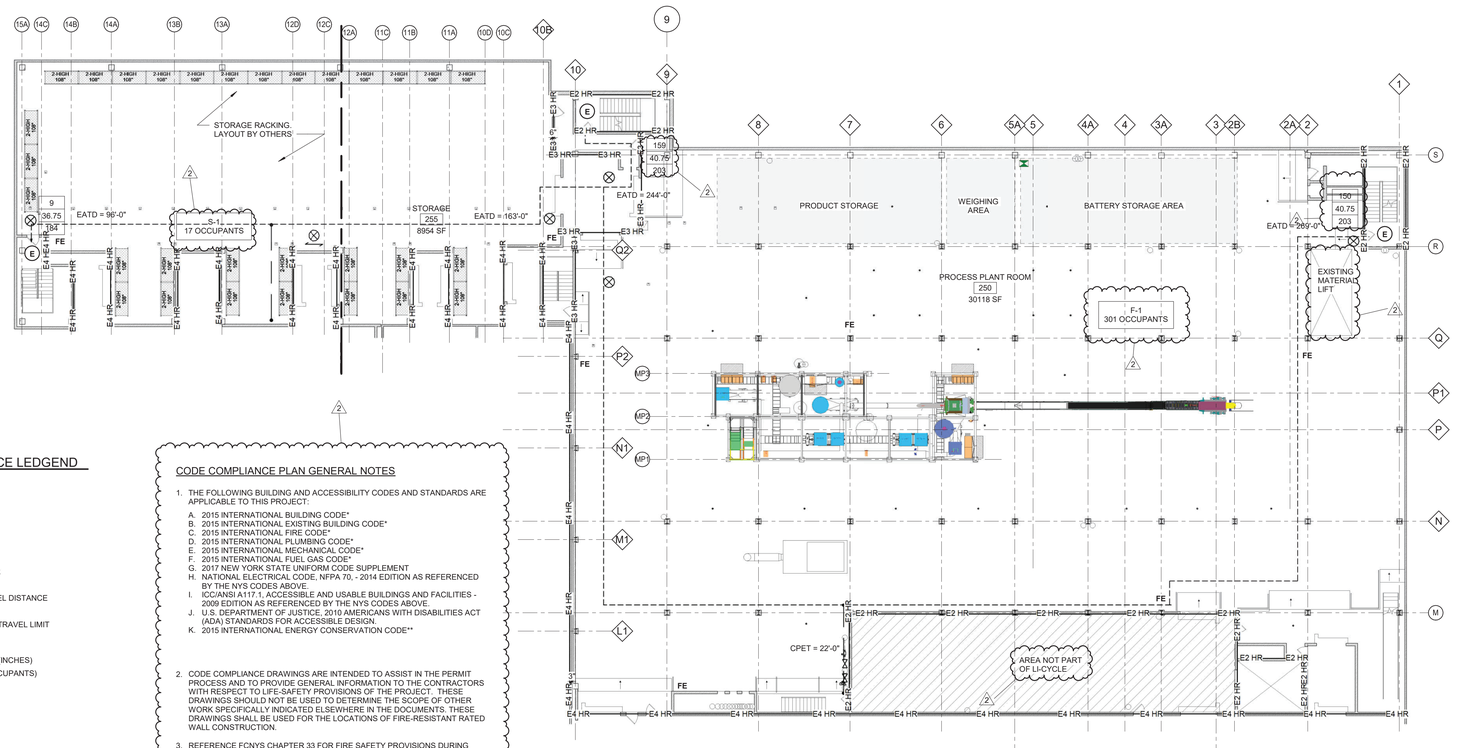
IF RESPECTIVELY "YES-NO" RESPONSES ABOVE, DOES PROJECT INCLUDE SCOPE FOR REQUIRED ACCESSIBILITY UPGRADES? (IEBC 2015 705.1 & 705.2) ☐ YES ☐ NO ☐ N/A

CODE COMPLIANCE LEDGEND

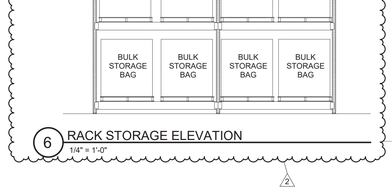
- (HE) HORIZONTAL EXIT
- (E) EXIT
- ⊗ EXIT SIGN
- FE FIRE EXTINGUISHER
- EATD EXIT ACCESS TRAVEL DISTANCE
- CPET COMMON PATH OF TRAVEL LIMIT
- ## EXIT LOAD
- ##" CLEAR EXIT WIDTH (INCHES)
- ## EXIT CAPACITY (OCCUPANTS)

CODE COMPLIANCE PLAN GENERAL NOTES

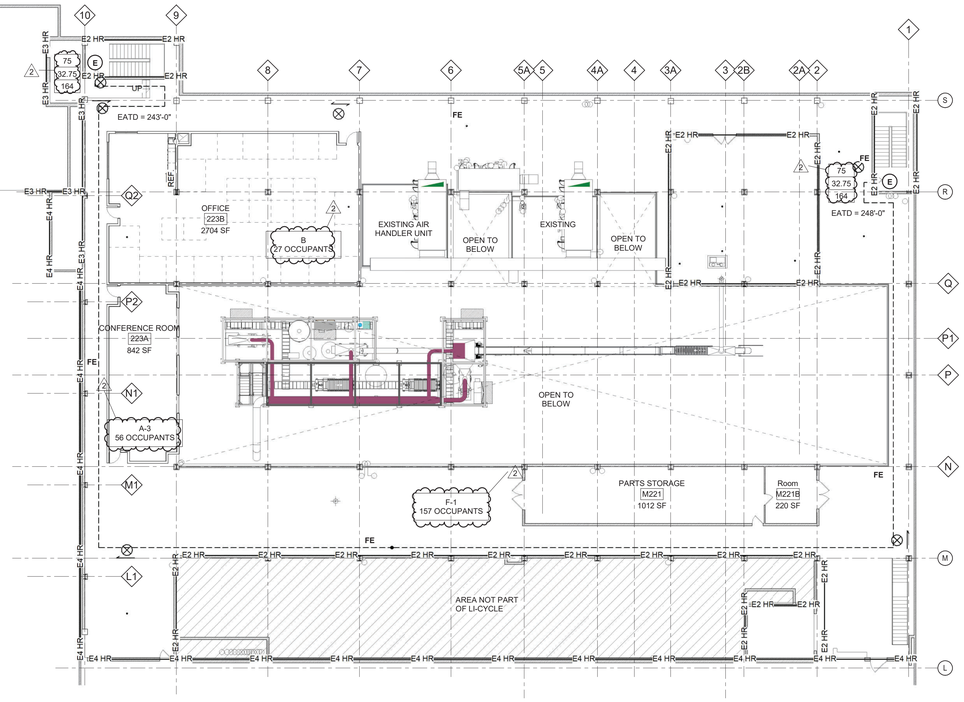
1. THE FOLLOWING BUILDING AND ACCESSIBILITY CODES AND STANDARDS ARE APPLICABLE TO THIS PROJECT:
   - A. 2015 INTERNATIONAL BUILDING CODE*
   - B. 2015 INTERNATIONAL EXISTING BUILDING CODE*
   - C. 2015 INTERNATIONAL FIRE CODE*
   - D. 2015 INTERNATIONAL PLUMBING CODE*
   - E. 2015 INTERNATIONAL MECHANICAL CODE*
   - F. 2015 INTERNATIONAL FUEL GAS CODE*
   - G. 2017 NEW YORK STATE UNIFORM CODE SUPPLEMENT
   - H. NATIONAL ELECTRICAL CODE, NFPA 70, - 2014 EDITION AS REFERENCED BY THE NYS CODES ABOVE.
   - I. ICC/ANSI A117.1, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES - 2009 EDITION AS REFERENCED BY THE NYS CODES ABOVE.
   - J. U.S. DEPARTMENT OF JUSTICE, 2010 AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN.
   - K. 2015 INTERNATIONAL ENERGY CONSERVATION CODE**
2. CODE COMPLIANCE DRAWINGS ARE INTENDED TO ASSIST IN THE PERMIT PROCESS AND TO PROVIDE GENERAL INFORMATION TO THE CONTRACTORS WITH RESPECT TO LIFE-SAFETY PROVISIONS OF THE PROJECT. THESE DRAWINGS SHOULD NOT BE USED TO DETERMINE THE SCOPE OF OTHER WORK SPECIFICALLY INDICATED ELSEWHERE IN THE DOCUMENTS. THESE DRAWINGS SHALL BE USED FOR THE LOCATIONS OF FIRE-RESISTANT RATED WALL CONSTRUCTION.
3. REFERENCE FCNYS CHAPTER 33 FOR FIRE SAFETY PROVISIONS DURING CONSTRUCTION, DEMOLITION.
4. * AS AMENDED BY 2017 NYS UNIFORM CODE SUPPLEMENT
   ** AS AMENDED BY 2016 NYS ENERGY CODE SUPPLEMENT
5. ALL EXISTING DOORS IN EXISTING RATED WALL ARE ASSUMED TO BE IN COMPLIANCE WITH NEW YORK STATE BUILDING CODE.



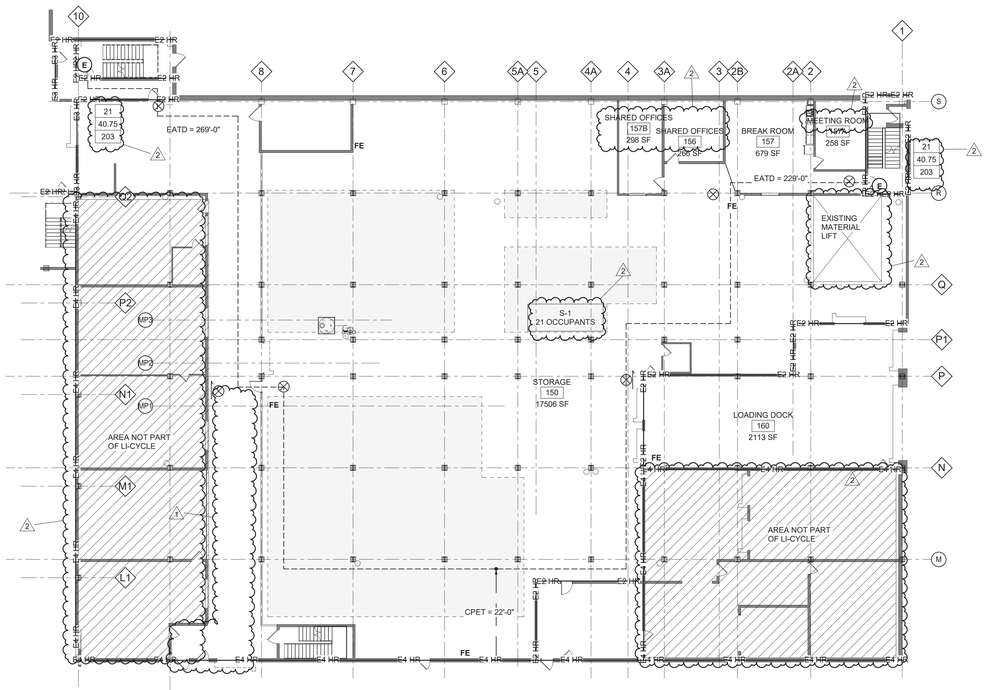
2 SECOND FLOOR LIFE SAFTEY PLAN
1/16" = 1'-0"



6 RACK STORAGE ELEVATION
1/4" = 1'-0"



3 SECOND FLOOR MEZZANINE LIFE SAFTEY PLAN
1/16" = 1'-0"



1 FIRST FLOOR LIFE SAFETY PLAN
1/16" = 1'-0"

ISSUED FOR BID

REFERENCE DWGS:

SWBR

SYM			

SYM		
	COORDINATION	
1	JG	06.04.2020
	CODE REVIEW COMMENTS	
1	JG	08.21.2020
	JG	09.30.2020

QTY	BLDG	OPER	SERIAL
ORDER NUMBER			

DEPARTMENT APPROVALS	DATE	ENGINEERING APPROVALS	DATE

ACAD/ ACAD | D

SCALE - ORIG DWG: As indicated

EASTMAN KODAK COMPANY

DRAWN	JG
DATE	03-06-2020
CHECKED	DJP
DATE	03-06-2020
DESIGN S.O.	
DES. SUPERVISOR	ROBERT SMARCZ

Code Compiance Drawings and Fire Safety Plans

LI-CYCLE

BLDG NO. 350

LOCATION EBP

350XX-918-003

SIZE A1 REV

DATE/ TIME: 10/13/2020 3:20:49 PM

FILE PATH: C:\1-Local Revit Models 2019\LI-Cycle_jgreenaker@swbr.com.rvt

Appendix C. *SDS Sheet of Typical Lithium-ion Battery*

SAFETY DATA SHEET

This Safety Data Sheet meets or exceeds the requirements of the Hazardous Products Regulation (HPR), the United States Occupational Safety and Health Administration (OSHA) hazard communication standard, the Australian National Occupational Health and Safety Commission (NOHSC), the Taiwan Bureau of Standards, Metrology & Inspection (BSMI), the Japan Ministry of Economy, Trade and Industry (METI), the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China(GB/T 16483-2008), Brazil standard ABNT NRB 14725-3, Malaysian Department of Environment and the European Union Commission Regulation (EC) No 1907/2006 and (EU) No 2015/830.

1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1. Product Identifier

Name of the substance: Molicel Rechargeable Lithium-ion cells and multi-cell battery packs.

Product Codes:
IBR18650*, ICR14500*, ICR18650*, IMR18650*, INR18650*, INR20700*, INR21700*, IHR18650*, ICP103450*, ICP1003450*, IBR26700*, IMR26700*, MCR1821*, ME202*.
***Product codes can be followed by letters and/or numbers (A -ZZ, 0-9) which denote model designations. List of models can be found in section 16 of this SDS.**

Identification Number: Not applicable
Registration Number: Not applicable

Synonyms: Lithium-ion Cell, Lithium-ion Pack, Lithium-ion Battery, Li-Ion Cell, Li-Ion Pack, Li-Ion Battery. Synonyms may be preceded by the brand name Molicel and followed by the product code and model designation. For example: Molicel Lithium-ion Battery ME202C, Molicel Lithium-ion Cell ICR18650J.
Issue Date: 28-Apr-2020
Version number: AS
Revision Date: 28-Apr-2020
Supersedes Date: 17-Dec-2019

1.2. Relevant identified uses of the substance or mixture and uses advised against.

Identified uses: Rechargeable Lithium-ion cell for single cell or Multi-cell lithium-ion battery packs.
Restrictions on Use: For use as a battery-based power supply only. Do not rupture or expose solution inside of the cell or pack.

1.3. Details of the supplier of the safety data sheet.

Supplier Name: E-One Moli Energy (Canada) Ltd.	**Factory Name: E-One Moli Energy Corp. (Taiwan)**
Address: 20,000 Stewart Crescent Maple Ridge, B.C., Canada, V2X9E7	**Address:** No.10 Dali 2nd Road, Tainan Science Park Shan-Hwa, Tainan County, 741, Taiwan
E-Mail: molicel@molienergy.com	**E-Mail:** service@molicel.com
Telephone: (604) 466-6654	**Telephone:** 886-6-5050666

1.4. Emergency telephone number

24 hour emergency number within North America: CANUTEC 1-(613) 996-6666, collect calls accepted. (*666 on a cellular phone In Canada Only).
National Poison Control Telephone Numbers: See table 7 in Section 16 for a list by Country/State.

1.5 Details of the local distributor or agent of the products listed on the safety data sheet.

Distributor/Agent Name:
Address: **Telephone:**
Other Information: **Email:**
Local 24 Hour Emergency Telephone Number:

2. Hazards Identification

Protective Clothing	NFPA Rating (USA)	EC Classification	WHMIS (Canada)	SafeWork (Australia)
Not required with normal use.		Not classified as hazardous	Not applicable with normal use.	Not classified as hazardous
GHS Hazard Symbol	**IATA**	**JIS (Japan)**	**Taiwan**	**China**
Not applicable with normal use.		Not classified as hazardous	Not classified as hazardous	Not classified as hazardous
United States	**Brazil**	**Malaysia**		
Not classified as hazardous	Not classified as hazardous	Not classified as hazardous		

Table 1

2.1. Classification of the substance or mixture.

2.1.1. Preparation Hazards and Classification: The product is a Lithium ion cell or battery and is therefore classified as an article and is not hazardous when used according to the recommendations of the manufacturer. The hazard is associated with the contents of the cell or battery. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains, and the seals remain intact. The potential for exposure should not exist unless the cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as Hazardous.

2.1.2. Classification according to Directive 67/548/EEC or 1999/45/EC as amended: Not applicable.

2.1.3. Classification according to Regulation (EC) No. 1272/2008 as amended: Not applicable.

2.1.4. Hazard Summary

Physical hazards: Not classified for physical hazards.
Health hazards: Not classified for health hazards.
Environmental hazards: Not classified for hazards to the environment.
Specific hazards: Exposure to contents of an open or damaged cell or battery: contact with this material will cause burns to the skin, eyes and mucous membranes.
May cause sensitization by skin contact.
Main Symptoms: Symptoms include itching, burning, redness and tearing.

2.2. Label elements

2.2.1. Label according to Regulation (EC) No. 1272/2008 as amended.

Identification Number: Not applicable.
Hazard pictograms: Not applicable.
Signal word: Not applicable.
Hazard statements: Not applicable under normal use in accordance with United Nations Conference on Environmental and Development (UNCED) and Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1200. The article does not meet the criteria for classification.

Precautionary Statement(s) Prevention	P102: Keep out of reach of children. P103: Read label prior to use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking. P234: Keep only in original container. P254: Wash hands thoroughly after handling.
Response (If cell/battery leaks)	P260: Do not breathe vapor or spray. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301/330/331: IF SWALLOWED: Rinse mouth. DO NOT induce vomiting. P303/361/353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304/340: If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305/351/338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER or doctor/physician. P363: Wash contaminated clothing before reuse. P370: In case of fire: Use carbon dioxide, dry chemical or water extinguisher. P391: Collect spillage.
Health (if cell/battery leaks)	H314: Causes severe skin burns and eye damage. H315: Causes skin irritation. H317: May cause an allergic skin reaction. H319: Causes serious eye irritation. H335: May cause respiratory irritation. H400: Very toxic to aquatic life. H410: Very toxic to aquatic life with long lasting effects.
Storage (Store as indicated in Section 7)	P402: Store in a dry place. P405: Store locked up. P410: Protect from sunlight.
Disposal	P406: Store any spilled/leaking electrolyte material in a corrosive resistant container with a resistant inner liner. P501: Dispose of batteries in accordance with applicable hazardous waste regulations.

Table 2

Supplemental label information: None.

2.3. Other Hazards.

2.3.1. Appearance, Color and Odor: Solid object with no odor.

2.3.2. Primary Routes(s) of Exposure: These chemicals are contained in a sealed enclosure. Risk of exposure occurs only if the cell or pack is mechanically, thermally, electrically or physically abused to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, ingestion, eye contact and skin contact.

2.3.3. Potential Health Effect(s):

2.3.3.1. Acute (short term): see Section 8 for exposure controls.
If this cell or pack has been ruptured, the electrolyte solution contained within the cell would be corrosive and can cause burns to skin and eyes.
Inhalation: Inhalation of materials from a sealed cell is not an expected route of exposure. Vapors or mists from a ruptured cell may cause respiratory irritation.
Ingestion: Swallowing of materials from a sealed cell is not an expected route of exposure. Swallowing the contents of an open cell can cause serious chemical burns to mouth, esophagus, and gastrointestinal tract.
Skin: Contact between the cell and skin will not cause any harm. Skin contact with the contents of an open cell can cause severe irritation or burns to the skin.
Eye: Contact between the cell and the eye will not cause any harm. Eye contact with the contents of an open cell can cause severe irritation or burns to the eye.
2.3.3.2. CHRONIC (long term): see Section 11 for additional toxicological data.

2.3.4. Medical Conditions Aggravated by Exposure: Not Available.

2.3.5. Interactions with other chemicals: Immersion in high conductivity liquids may cause corrosion and breaching of the cell or battery enclosure. The electrolyte solution inside of the cells may react with alkaline (basic) materials and present a flammability hazard.

2.3.6. Potential Environmental Effects: Not Available.

3. Composition/information on ingredients

3.1. As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use.

Canada: This is not a controlled product under WHMIS. This product meets the definition of a "manufactured article" and is not subject to the regulations of the Hazardous Products Act.

USA: This cell or battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Australia: The product is a Lithium-ion cell or battery and is therefore classified as an article and is not hazardous when used according to the recommendations of the manufacturer. The hazard is associated with the contents of the cell or battery. If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as Hazardous according to the criteria of the National Occupational Health and Safety Commission (SafeWork Australia).

EU: This product is an article according to the REACH Regulation (1907/2006) and (EC) No 2015/830.

Taiwan: This product is not classified as a dangerous good.

Japan: This product is not classified as a dangerous good.

China: This product is not classified as a dangerous good.

Brazil: This product is an article according to ABNT NRB 14725-2:2009.

Cell Component	Chemical Name	CAS No.	EINECS	*Concentration range in electrolyte (w/w %)	*Mass range in cell (g/g %)	GHS Classification
Electrolyte	Contains Electrolyte salt and solvents.				5-20	Skin Corr 1B – H314
Electrolyte salt	Lithium hexafluorophosphate	21324-40-3	244-334-7	5-30	1-5	-
Electrolyte solvents	Includes one or more of the following; Ethylene Carbonate Propylene Carbonate Diethyl Carbonate Dimethyl Carbonate Ethyl Methyl Carbonate	 96-49-1 108-32-7 105-58-8 616-38-6 623-53-0	 202-510-0 203-572-1 203-311-1 210-478-4 Not Listed	70-95	5-20	-
PVDF	Polyvinylidenfluoride	24937-79-9	Not Listed	-	<1	-
Copper	Cu	7440-50-8	231-159-6	-	9-18	-
Aluminium	Al	7429-90-5	231-072-3	-	17-27	-
Cathode	Includes one or more of the following; Lithium Cobaltite Manganese Nickel Aluminum	 12190-79-3 7439-96-5 7440-02-0 7429-90-5	 235-362-0 231-105-1 231-111-4 231-072-3	-	20-50	-
Anode	Includes one or more of the following; Graphite Carbon Black	 7782-42-5 1333-86-4	 231-955-3 215-609-9	-	13-18	-
Steel, Nickel, and inert components		Various	Various	-	Balance	-

Table 3

*Quantities may vary depending on cell or battery model.

4. First Aid Measures

4.1. Description of first aid measures
The hazardous components of this cell or battery are contained within a sealed unit. The following measures are only applicable if exposure has occurred to components when a cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. The hazardous contents are caustic alkaline electrolytes contained in cells with lithium metal oxide cathodes, graphite and carbon anodes and Polyvinylidenfluoride binders.

Ingestion:	Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Contact your local poison control center and quickly transport victim to an emergency care facility.
Eye Contact:	If eye contact with contents of an open cell occurs, immediately flush the contaminated eye(s) with water. Quickly transport victim to an emergency care facility.
Skin Contact:	Immediately flush with water. If irritation or pain persists, seek medical attention.
Inhalation:	Remove the patient from exposure into fresh air, seek medical attention.

PROTECTION FOR FIRST AIDERS: Do not enter corrosive vapor contaminated areas without a respirator or a Self-Contained Breathing Apparatus. Wear adequate personal protective equipment as indicated in Section 8.

FIRST AID FACILITIES: Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

4.2 MOST IMPORTANT SYMPTOMS & EFFECTS, ACUTE & DELAYED, CAUSED BY EXPOSURE:

ACUTE: The contents of the battery are rated as corrosive. Ingestion of the electrolyte could lead to severe gastrointestinal tract irritation with nausea, vomiting and potentially burns. Inhalation of vapors may lead to severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing. Eye contact may lead to severe eye irritation or in worst case scenario irreversible damage and possible eye burns. Skin contact may lead to irritation and possible skin burns.

CHRONIC: Skin contact may aggravate/exacerbate existing skin conditions, such as dermatitis. Chronic inhalation may lead to the same symptoms as listed for acute inhalation above.

4.3 Indication of any immediate medical attention and special treatment needed
ADVICE TO DOCTOR: Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

5. Fire Fighting Measures

5.1 Extinguishing media

- **5.1.1 Suitable extinguishing media:** Dry chemical, carbon dioxide and foam. Water acts as a cooling agent.
- **5.1.2 Unsuitable extinguishing media:** Strong oxidizing agents, strong reducing agents, strong acids and strong alkalis. **Despite water incompatibility, water is the most effective firefighting tool to control the spread of fire to other cells and batteries and combustibles.**
- **5.1.3 Explosion Data:** Closed containers may explode, burst, rupture or vent when exposed to temperatures above 120°C (248°F).
- **5.1.4 Hazchem Code** (Australia, New Zealand, UK and Malaysia)**: 4W**
- **5.1.5 TDG/DOT ERG Code: 147**
- **5.1.6 Sensitivity to Mechanical Impact:** Extreme mechanical abuse will result in rupture of the individual battery cells.
- **5.1.7 Sensitivity to Static Discharge:** Electrostatic discharges imposed directly on the spilled electrolyte may start combustion.

5.2 Special hazards arising from the Chemical:
The interaction of water vapor and exposed lithium hexafluorophosphate (LiPF6) may result in the generation of hydrogen and hydrogen fluoride (HF) gas. Contact with battery electrolyte may be irritating to skin, eyes and mucous membranes. Thermal degradation may produce hazardous fumes of lithium, cobalt and manganese, hydrofluoric acid, hydrogen and oxides of carbon, aluminum, lithium, copper and cobalt as well and smoke and irritating, corrosive and/or toxic gases. Fumes may cause dizziness or suffocation.

5.3 Advice for firefighters:
In case of fire where lithium-ion cells and batteries are present, flood the area with water. If any cells or batteries are burning, water may not extinguish them, but will cool the adjacent cells or batteries and control the spread of fire. Carbon Dioxide, dry chemical and foam extinguishers may be preferred for small fires, but also may not extinguish burning lithium-ion cells or batteries.

Burning cells or batteries will burn themselves out. Virtually all fires involving lithium-ion cells and batteries can be controlled with water. When water is used, however, hydrogen gas may be evolved which can form an explosive mixture with air. LITH-X (powdered graphite) or copper powder fire extinguishers, sand, dry ground dolomite or soda ash may also be used. These materials act as smothering agents.

5.4 Protective Equipment and Precautions for firefighters:
In the case of a fire and the release of hydrogen fluoride, it is critical to protect the skin from any contact. Fire fighters should wear a self-contained breathing apparatus. Burning lithium-ion cells and batteries can produce toxic fumes including hydrogen fluoride (HF), oxides of carbon, aluminum, lithium, copper and cobalt. Volatile phosphorous penta fluoride may form at temperatures above 110°C (230°F). Wear adequate personal protective equipment as indicated in Section 8.

6. Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures:

6.1.1. For non-emergency personnel.

6.1.1.1. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed areas before entering. Wear adequate personal protective equipment as indicated in Section 8.

6.1.2. For emergency responders

6.1.2.1. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind and keep out of low areas. Ventilate closed areas before entering. Do not enter corrosive vapor contaminated areas without a respirator or Self-Contained (SCBA) Breathing Apparatus.
Suitable fabric for personal protective clothing: Chemical resistance gloves, safety glasses/goggles or face shield and chemical resistant clothing. Wear adequate personal protective equipment as indicated in Section 8.

6.2. Environmental precautions

6.2.1. Absorb spilled material with non-reactive absorbent such as vermiculite, clay or earth. Prevent from migration into soil, sewers and natural waterways – inform local authorities if this occurs.

6.3. Methods and material for containment and cleaning up

6.3.1. Evacuate spill area immediately and remove sources of ignition. Do NOT touch spilled material. Use non-sparking tools and equipment where applicable. Ensure that cleanup procedures do not expose spilled material to any moisture. Cover all drains and exits to the environment to prevent migration into the soil, sewers and natural waterways.

6.3.2. Cleanup personnel must be trained in the safe handling of this product. Spills may be absorbed by non-reactive absorbents such as vermiculite and then collected with an electrically protected vacuum cleaner or by wet-brushing and placing into a suitable container for disposal. Place cells or batteries into individual plastic bags and then place into appropriate containers and close tightly for disposal. Immediately transport closed containers outside. Lined steel drums are suitable for storage of damaged cells or batteries until proper disposal can be arranged. Ventilate area and wash spill site after material pickup is complete. Please consult local regulations on disposal of hazardous waste for complete details.

6.3.3. Never dispose of damaged cells or batteries in a fire.

6.4. Reference to other sections

6.4.1. For information on Hazards, see Section 2 of the SDS.
6.4.2. For information on personal protective equipment, see Section 8 of the SDS.
6.4.3. For information on physical and chemical properties, see Section 9 of the SDS.
6.4.4. For information on stability and reactivity, see Section 10 of the SDS.
6.4.5. For information on environmental effects, see Section 12 of the SDS.
6.4.6. For waste disposal, see section 13 of the SDS.

7. Handling and Storage

7.1. Precautions for safe handling

7.1.1. Do not short circuit, open, disassemble, crush, puncture or burn cells or batteries. Do not expose cells or batteries to extreme heat or fire. Do not solder cells. Do not mix cells of different types and brands. Do not mix new and used cells or batteries. Do not incinerate the cells or batteries as there is a danger of explosion. Do not use or charge damaged, defective or deformed cells or batteries.

7.1.2. Observe good industrial hygiene practices. Wash hands thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

7.2.1. Conditions for safe storage: Store in a cool, dry, well-ventilated area, out of direct sunlight and away from heat and ignition sources. To minimize any adverse effects on cell and/or battery performance, it is recommended that the cells and/or batteries be kept at room temperature (25°C +/- 5°C). Elevated temperatures can result in shortened cell and/or battery life. Keep out of reach of children. Store away from incompatible materials, see Section 10 of the SDS.

7.2.2. Incompatibilities: Water, strong oxidizing agents, strong reducing agents, strong acids and strong alkalis.

7.3. Specific end use(s)

7.3.1. Rechargeable Lithium-ion cell for single cell or Multi-cell lithium-ion battery packs. For use as a battery-based power supply.

7.4. Links to other Sections

7.4.1. For information on recommended uses, see Section 1 of this SDS.
7.4.2. For information on accidental release measures, see Section 6 of this SDS.
7.4.3. For information on personal protective equipment, see Section 8 of this SDS.
7.4.4. For information on physical and chemical properties, see Section 9 of this SDS.
7.4.5. For information on stability and reactivity, see Section 10 of this SDS.
7.4.6. For information on toxicological information, see Section 11 of this SDS.
7.4.7. For information on environmental effects, see Section 12 of this SDS.
7.4.8. For information on transport hazard classes, see Section 14 of this SDS.

8. Exposure Controls, Personal Protection

8.1. Exposure Control Measures

8.1.1. Exposure Limit Values: Airborne exposures to hazardous substances are not expected when the cells or batteries are used for their intended purposes. Exposure standards are not applicable to the sealed articles.
8.1.2. Biological Monitoring: Not applicable.
8.1.3. Control Banding: Not applicable.
8.1.4. Recommended monitoring procedures: Follow standard monitoring procedures.
8.1.5. Derived no-effect level (DNEL): Not applicable.
8.1.6. Derived minimal effect level (DMEL): Not applicable.
8.1.7. Predicted no-effect concentrations (PNECs): Not applicable.

8.2. Engineering Controls

8.2.1. Engineering Controls: Special ventilation is not required when using these products in normal use scenarios. Ventilation is required if there is leakage from the cell or battery.
8.2.2. Individual Protection Measures

8.2.2.1. Eye and Face protection: Eye protection is not required when handling cells or batteries during normal use. Wear chemical resistant safety glasses/goggles or face shield if handling a leaking or ruptured cell or battery.

8.2.2.2. Skin (Hand) protection: Hand protection is not required when handling the cell or battery during normal use. Chemical resistant gloves are recommended when dealing with a leaking or ruptured cell or battery.

8.2.2.3. Skin (clothing) protection: Skin protection is not required when handling the cell or battery during normal use. Wear long sleeved clothing to avoid skin contact if handling a leaking or ruptured cell or battery. Soiled clothing should be washed with detergent prior to re-use.

8.2.2.4. Respiratory protection: During routine operation, a respirator is not required. However, if dealing with an electrolyte leakage and irritating vapors are generated, an approved half face inorganic vapor and gas/acid/particulate respirator is required.

8.2.2.5. Thermal Protection: Not applicable.

8.2.2.6. Other Protective Equipment: Have a safety shower or eye wash station readily available

8.2.3. Hygiene Measures: Do not eat, drink or smoke in work areas. Avoid storing food, drink or tobacco near the product. Practice and maintain good housekeeping.

8.2.4. Environmental exposure controls: Avoid release to the environment.

Respiratory Protection	Hand Protection	Eye Protection	Other
			
In all fire situations, use self-contained breathing apparatus.	In the event of leaking or ruptured cells or batteries, wear gloves.	Safety glasses are recommended in case of leaking or ruptured cells or batteries.	In the event of leaking or ruptured cells or batteries, wear protective clothing.

Table 4

9. Physical and Chemical Properties

Physical State:	Solid, Sealed Unit*	**Vapor Pressure (mm Hg @ 20°C):**	Not Applicable*
Appearance:	Cell or Battery Pack	**Vapor Density:**	Not Applicable*
pH:	Not Applicable*	**Solubility in Water:**	Insoluble
Relative Density:	Not Applicable*	**Water/Oil distribution coefficient:**	Not Applicable*
Boiling Point:	Not Applicable*	**Odor Type:**	Odorless
Melting Point:	Not Applicable*	**Odor Threshold:**	Not Applicable*
Viscosity:	Not Applicable*	**Evaporation Rate:**	Not Applicable*
Oxidizing Properties:	Not Applicable*	**Auto Ignition Temperature (°C):**	Not Applicable*
Flash Point and Method (°C):	Not Applicable*	**Flammability Limits (%):**	Not Applicable*
Octanol/Water Partition Coefficient:	Not Applicable*	**Decomposition Temperature:**	90°C

Table 5

10. Stability and Reactivity

10.1. Stability and Reactivity

10.1.1. Reactivity: The cells or batteries do not pose any further reactivity hazards other than those listed in the following sub-sections.

10.1.2. Chemical Stability: The cells or batteries are stable under normal ambient and anticipated conditions of use, storage and transport.

10.1.3. Possibility of hazardous reactions: Keep away from water, strong oxidizing agents, strong reducing agents, strong acids and strong alkalis. Reaction of the leaking electrolyte materials with water may produce flammable and explosive hydrogen gas as well as corrosive hydrogen fluoride gas. Hazardous polymerization does not occur.

10.1.4. Conditions to avoid: Avoid exposing the cells or batteries to fire or temperatures above 80°C. Do not disassemble, crush, short circuit, puncture, immerse in liquid, burn, expose to flame or install with incorrect polarity. Avoid mechanical, physical or electrical abuse.

10.1.5. Incompatible materials: Do not immerse in water or other high conductivity liquids.

10.1.6. Hazardous decomposition products: May decompose to produce hydrogen fluoride, phosphorus oxides, sulfur oxides, sulfuric acid, lithium hydroxide, carbon monoxide and carbon dioxide.

10.2. Links to other Sections

10.2.1. For information on Hazards, see Section 2 of this SDS.

10.2.2. For information on fighting fires, see Section 5 of this SDS.

10.2.3. For information on accidental release, see Section 6 of this SDS.

10.2.4. For information on handling and storage, see Section 7 of this SDS.

10.2.5. For information on disposal, see Section 13 of this SDS.

11. Toxicological Information

11.1. Information on toxicological effects:
The hazardous components of the cell or battery are contained within a sealed unit. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains, and the seals remain Intact. The potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, electrically or physically abused/damaged. **The following toxicology data is in respect to if a person comes into contact with the electrolyte.**

11.2. Acute Toxicity:

11.2.1. Swallowed: The electrolyte contained within the cell or battery is a corrosive liquid. Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, diarrhea, abdominal pain and chemical burns to the gastrointestinal tract. During normal usage ingestion should not be a means of exposure.

11.2.2. Eye: The electrolyte contained within the cell or battery is a corrosive liquid and it is expected that it would cause irreversible damage to the eyes. Contact may cause corneal burns. Effects may be slow to heal after eye contact. Correct handling procedures incorporating appropriate eye protection should minimize the risk of eye irritation.

11.2.3. Skin: The electrolyte contained within the cell or battery is a corrosive liquid and it is expected that it would cause skin burns or severe irritation to the skin if not washed off immediately. Correct handling procedures should minimize the risk of skin irritation. People with pre-existing skin conditions, such as dermatitis, should take extreme care so as not to exacerbate the condition.

11.2.4. Inhaled: Inhalation of vapors from a leaking cell or battery is expected to cause severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.

11.3. Skin Corrosion/Irritation: The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit Dermal Corrosivity/Irritation.

11.4. Serious Eye Damage/Irritation: The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit serious Damage/Corrosivity.

11.5. Respiratory or Skin Sensitization: The electrolyte contained within the cell or battery is not expected to be a skin sensitizer according to OECD test 406, based on the available data and the known hazards of the components. The electrolyte contained within the cell or battery is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.

11.6. Germ Cell Mutagenicity: The electrolyte contained within the cell or battery is not expected to be mutagenic according to test such as OECD tests 471, 475, 476, 478 and 479, based on the available data and the known hazards of the components.

11.7. Carcinogenicity: The electrolyte contained within the cell or battery is not expected to be a carcinogen. The cathode contains Cobalt and Nickel components. These components are classified as IARC 2B – possibly carcinogenic to humans, however they do not pose a threat when contained in the cell or battery sealed unit.

11.8. Reproductive Toxicity: The electrolyte contained within the cell or battery is not expected to be a reproductive hazard according to test such as OECD tests 414 and 421, based on the available data and the known hazards of the components.

11.9. Specific Target Organ Toxicity (STOT) – Single Exposure: The electrolyte contained within the cell or battery is corrosive and is expected to cause respiratory irritation by inhalation. Inhalation of vapors may lead to severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.

11.10. Specific Target Organ Toxicity (STOT) – Repeated Exposure: The cells or batteries are not expected to cause organ damage from prolonged or repeated exposure according to tests such as OECD tests 410 and 412, based on the available data and the known hazards of the components.

11.11. Aspiration Hazard: The cells or batteries are not classified as an aspiration hazard, based on the available data and the known hazards of the components. However, due to the corrosive nature of the product if swallowed, do NOT induce vomiting. If vomiting has occurred after ingestion the person should be observed to ensure that aspiration into the lungs has not occurred and assessed for chemical burns to the gastrointestinal and respiratory tracts.

11.12. Other Information: No additional data is available.

11.13. Links to other sections.

11.13.1. For information on hazards, see Section 2 of this SDS.

11.13.2. For information on first aid, see Section 4 of this SDS.

11.13.3. For information on accidental release, see Section 6 of this SDS.

11.13.4. For information on handling and storage, see Section 7 of this SDS.
11.13.5. For information on exposure controls and personal protection, see Section 8 of this SDS.
11.13.6. For information on the physical and chemical properties, see Section 9 of this SDS.
11.13.7. For information on disposal, see Section 13 of this SDS.
11.13.8. For information on transport hazard classes, see Section 14 of this SDS.
11.13.9. For information on regulatory, see Section 15 of this SDS.

12. Ecological Information

12.1. Ecotoxicity: The sealed cell or battery does not pose an Ecotoxicity hazard. Cells or batteries under normal use conditions pose no ecotoxicity hazard. In the case of a broken or damaged cell or battery and leakage of the electrolyte, it will react with water and potentially cause damage to flora and fauna if not disposed of properly. See Section 13 of this SDS for proper disposal considerations.
12.2. Persistence and degradability: There is currently no data available.
12.3. Bio accumulative potential: There is currently no data available.
12.3.1. Partition coefficient n-octanol/water (log Kow): Not applicable.
12.3.2. Bio concentration factor (BCF): Not available.
12.4. Mobility in soil: There is currently no data available.
12.5. Results of PBT and vPvB assessment: Not a PBT or vPvB substance or mixture.
12.6. Other adverse effects: Solid cells and batteries released into the natural environment will slowly degrade and may release harmful or toxic substances. Cells and batteries are not intended to be released into water or on land but should be disposed or recycled according to local regulations. See section 13 of this SDS for Disposal Considerations.
12.7. Links to other Sections.
12.7.1. For information on accidental release, see Section 6 of this SDS.
12.7.2. For information on disposal, see Section 13 of this SDS.
12.7.3. For information on transport hazard classes, see Section 14 of this SDS.

13. Disposal Considerations

13.1. Waste treatment methods: Cell and battery recycling is encouraged. Cells and batteries should not be released into the environment, do **NOT** dump into any sewers, on the ground or into any body of water. Do not dispose of in fire. Used cells and batteries should be stored in their original packaging, a plastic bag or with their terminals/contacts taped to minimize the potential for short-circuiting to occur. Cells and batteries should be fully discharged before being sent for recycling. Do not store used cells or batteries near heat sources, chemicals or food. Do not store or transport used lithium-ion cells or batteries with lead acid batteries as they have different regulatory requirements. Do not break open or damage lithium-ion cells or batteries prior to disposal. Care should always be taken to ensure that used cells or batteries are not damaged during storage or transport. Store material for disposal as indicated in Section 7 Handling and Storage.

13.2. Classification of the waste to comply with Waste Regulations.
13.2.1. Canada: Spent cells and batteries are not considered hazardous waste. Cells and batteries involved in a fire may be hazardous waste. Dispose of in accordance with local, provincial and federal laws and regulations. Consult the Canadian Environmental Protection Act for additional details. BC, MN, ON and QC have regulated the collection of waste batteries, contact your provincial and local government for more details.

13.2.2. USA: Spent cells and batteries are not considered hazardous waste. Cells and batteries involved in a fire may be hazardous waste. Dispose of in accordance with local, state and federal laws and regulations. Consult universal/hazardous waste regulations for further information regarding disposal of spent batteries. If a cell or battery is leaking/broken open, consult hazardous waste regulations under US EPA Resource Conservation and Recovery Act (RCRA), waste code: D003 (reactivity).
CA, UT, WY, ND, SD, NM, TX MN, IA, WI, AR, LA, MS, IN, KY, WV, VA, NC, SC, FL, PR, PA NY, ME VT, NJ, NH, CT and MD have state battery recycling requirements in effect. CA, FL, IA, MD, ME, MN, NJ, NY and VT require battery producers to offer or fund battery recycling. Consult state and local regulations for further disposal requirements.

13.2.3. Australia: Spent cells and batteries must be taken for recycling or disposal at an appropriate collection depot by suitably licensed contractors in accordance with local council or government regulations.
13.2.3.1. Which Bin hotline:1300 137 118.

13.2.4. EU: Waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. See Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators.
13.2.4.1. EU Waste Code: 16 06 05 – other batteries and accumulators.

13.2.5. Taiwan: Cells and batteries are not considered hazardous waste. Cells and batteries should be recycled at an appropriate collection site in accordance with government regulations.

13.2.6. Japan: Recycling of spent lithium-ion cells and batteries is regulated by the Wastes Disposal and Public Cleaning Law and the Law for Promotion of Effective Utilization of Resources, cells and batteries should be recycled at a JBRC (Japan Battery Recycling Center) approved facility.

13.2.7. Brazil: Lithium-ion cells and batteries should be recycled according to the National Solid Waste Policy (PNRS) of CONAMA in compliance with the directives and regulations of the National System for Environment (SISNAMA).

13.2.8. Malaysia: Lithium-ion cells and batteries are considered scheduled wastes and must be sent to a proper collection, treatment, recycling and disposal center.

13.2.8.1. Scheduled Waste Code: SW103

13.3. Classification of the waste to comply with Transport Regulations: Spent lithium-ion cells and batteries are not considered hazardous waste. Lithium-ion cells and batteries involved in a fire may be hazardous waste and should be classified as such. Damaged lithium-ion cells and batteries are explicitly prohibited from transport by air.

13.4. Classification of Packaging materials: Unsoiled excess packaging should be disposed of according to any applicable recycling regulations and is not considered hazardous waste. Soiled packaging or packaging exposed to the interior of a lithium-ion cell or battery pack should be considered hazardous waste and disposed of according to local hazardous waste rules and regulations.

14. Transport Information

Lithium-ion cells and batteries are regulated for land, sea and air transportation. It is recommended that Lithium-ion cells and batteries should not be fitted to equipment during transportation. **Note:** Cells and Batteries must always be protected against short-circuiting during transport. Special precautions should be undertaken when damaged or defective cells and batteries are transported. You must contact the manufacturer before transporting damaged or defective cells and batteries. It is prohibited to carry defective or damaged cells and batteries by air.
E-One Moli Energy cells and batteries are designed to comply with all applicable shipping regulations as prescribed by industry and legal standards which include compliance with the UN Recommendations on the Transport of Dangerous Goods, IATA Dangerous Goods Regulations, U.S. DOT regulations for the safe transport of lithium-ion batteries, the International Maritime Dangerous Goods Code and the Canadian Transport of Dangerous Goods regulations.

14.1. UN Number: **UN3480 or UN3481**

14.2. UN Proper Shipping Name:
UN3480 – Lithium Ion Batteries.
UN3481 – Lithium Ion Batteries Contained in Equipment
UN3481 – Lithium Ion Batteries Packed with Equipment

14.3. Transport Hazard Class(es):

Class: 9
Subsidiary Risk: -
Label(s): Class 9 Lithium Label, Lithium Handling Label, Cargo Aircraft Only

Hazard No. (ADR): 9
Tunnel Restriction code: E

14.4. Packing Group: See Regulations.

14.5. Environmental hazards:
Marine Pollutant: No

14.6. Special Precautions for user: Read safety instructions, SDS and emergency procedures before handling.

14.6.1. Hazchem Code: **4W**
14.6.2. TDG/DOT ERG Code: **147**
14.6.3. ICAO/IATA ERG Code: **12FZ**

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not Applicable

14.8. Modal Information

14.8.1. Land (ADR): UN3480 – P903, P908, P909, P910, P911, LP903, LP904, LP905 and LP906.
(Special Provision 188, 230, 310, 348, 376, 377 and 636 may apply.)
UN3481 – P903, P908, P909, P910, P911, LP903, LP904, LP905 and LP906.
(Special Provision 188, 230, 310, 348, 360, 376, 377 and 636 may apply.)

14.8.2. Land (RID): UN3480 – P903, P908, P909, P910, LP903 or LP904
(Special Provision 188, 230, 310, 348, 376, 377 and 636 may apply.)
UN3481 – P903, P908, P909, LP903 or LP904
(Special Provision 188, 230, 348, 360, 376, 377 and 636 may apply.)

14.8.3. Land (ADN): UN3480 – P903, P908, P909, P910, LP903 or LP904
(Special Provision 188, 230, 310, 348, 376, 377, 387 and 636 may apply.)
UN3481 – P903, P908, P909, P910, LP903 or LP904
(Special Provision 188, 230, 310, 348, 360, 376, 377 and 636 may apply.)

14.8.4. Land (TDG): UN3480 – Special Provision 34, 123, 137, 138 and 159 may apply.
UN3481 – Special Provision 34, 123, 137, 138 and 159 may apply.

14.8.5. Sea (IMDG): UN3480 and UN3481 - P903, P908 or P910
(Special provision 188, 230, 310, 348, 376, 377 and 384 may apply.)
EmS: F-A, S-I; Stowage Category A, Stowage code: SW19
IMDG Code: 9033

14.8.6. Air (IATA): UN3480/UN3481 – PI965, PI966 and PI967
(Special Provision A48, A88, A99, A154, A164, A183, A201, A206, A213, A331, A334 and A802 may apply).
ERG Code: 12FZ
Lithium ion cell or batteries - Lithium ion batteries in compliance with Packing Instruction 965.
Lithium ion cell or batteries packed with equipment - Lithium ion batteries in compliance with Packing Instruction 966.
Lithium ion cell or batteries contained in equipment - Lithium ion batteries in compliance with Packing Instruction 967.

Molicel products listed under this SDS will conform to various sections of the packing instructions based on the contents, packaging and mode of the shipment. Please see the shipping documents for complete details for individual shipments. This document is not intended to replace or authorize shipments of lithium-ion cells; it is intended as a guide for use by trained individuals.

15. Regulatory Information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture:

15.1.1. International Information

15.1.1.1. Montreal Protocol (Ozone depleting substances): Not applicable

15.1.1.2. The Stockholm Convention (Persistent Organic Pollutants): Not applicable

15.1.1.3. The Rotterdam Convention (Prior informed consent): Not applicable

15.1.1.4. The Basel Convention (Hazardous Waste): Not applicable

15.1.1.5. The MARPOL Convention (Prevention of pollution from Ships): Not applicable

15.1.1.6. UN Transportation of Dangerous Goods: All cells and batteries have passed the applicable testing.

15.1.2. Canadian Federal, Provincial and Territorial Regulations:
These products have been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

WHMIS Classification: Not Controlled, manufactured article.

New Substance Notification Regulations: Lithium hexafluorophosphate and Ethyl Methyl Carbonate are listed on the Non-Domestic Substance List (NDSL). All other ingredients in the product are listed, as required, on Canada's Domestic Substances List (DSL).

National Pollutant Release Inventory (NPRI) and Ontario Regulation 127/01 Substances:
Copper, CAS#7440-50-8, 9-18% w/w
Manganese, CAS#7439-96-5, 20-50% w/w
Nickel, CAS#7440-02-0, 20-50% w/w

British Columbia, Manitoba, Ontario and Quebec require all manufacturers of consumer batteries to participate in a stewardship plan to provide free collection and recycling of consumer batteries that they produce. Recycling is encouraged in all Provinces and Territories.

15.1.3. United States Federal and State Regulations:
TSCA Status: All ingredients in these products are listed on the TSCA inventory.

OSHA: These products do not meet criteria as per Part 1910.1200, manufactured article.

SARA EPA Title III: None.

Sec. 302/304: None.
Sec. 311/312: None.
Sec. 313: Supplier Notification: This Product Contains a toxic chemical or chemicals subject to the reporting requirements of section 313 of (Title) III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Supplier notification requirement does not apply to batteries that are considered consumer products.

Chemical	CAS	% by weight
Aluminium	7429-90-5	17-27
Copper	7440-50-8	9-18
Graphite	7782-42-5	13-18
Lithium Cobaltite	12190-79-3	20-50
Lithium-Hexafluorophosphate	21324-40-3	1-5

CERCLA RQ : Lithium Cobaltite (CAS 12190-79-3), Copper (CAS 7440-50-8), Nickel (CAS 7440-02-0).
US EPA Waste Code: D003 (reactivity) – damaged and leaking cell or battery only.
State of California: Rechargeable Battery Recycling Act – Division 30, Part 3, Chapter 8.4 of the Public Resource Code. Consumers must recycle all single use batteries or take them to a household hazardous waste disposal facility, a universal waste hander or an authorized recycling facility.
California Proposition 65-Safe Drinking water and toxic enforcement act.
E-One Moli Energy products and packaging may contain chemicals known to the state of California to cause cancer or birth defects or other reproductive harm. E-One Moli Energy has chosen to provide a warning based on its knowledge about the possible presence of one or more listed chemicals without attempting to evaluate the exposure. With E-One Moli Energy products, the exposure may be negligible or well within the "no significant risk" range, however, out of an abundance of caution, E-One Moli Energy has elected to provide a proposition 65 warning for California residents.
State of Minnesota: Rechargeable Battery and Products Law – Rechargeable batteries and products with non-removable batteries cannot be disposed as mixed municipal waste.
State of New York: Rechargeable Battery Law – It is illegal to dispose of rechargeable batteries in the state of New York as solid waste.

15.1.4. Australia and New Zealand
SUSMP: Not applicable
AICS: All ingredients are on the AICS list.
HSNO Approval number: Not applicable
HSNO Group Title: Not applicable
NOHSC:1008 Risk Phrases: R34 - Causes Burns.
NOHSC:1008 Safety Phrases:
S1 – Keep locked up.
S2 – Keep out of reach of children.
S23 – Do not breathe vapor.
S24/25 – Avoid contact with skin and eyes.
S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S27/28 – After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of water.
S36/37/39 – Wear suitable protective clothing, gloves and eye/face protection.
S56 – Dispose of this material and its container at hazardous waste or special waste collection point.
S62 – If swallowed, DO NOT induce vomiting: seek medical advice immediately and show this container or label.
S64 – If swallowed, rinse mouth with water (Only if the person is conscious).
AS/NZS 5139: Not Applicable

15.1.5. EC Classification for the Substance/Preparation:
These products are not classified as hazardous according to Regulation (EC) No. 1272/2008.
Keep out of the reach of children.

15.1.5.1. EU Regulations:
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I: Not listed.
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II: Not listed.
Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I as amended: Not listed.

Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended: Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended: Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as amended: Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended: Not listed.
Regulation (EC) No. 166/2006, REACH Article 59(10) Candidate List as currently published by ECHA: Not listed.

15.1.5.2. EU Authorizations:
Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended: Not listed.

15.1.5.3. EU Restrictions on use:
Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended:
Aluminium (CAS 7429-90-5)
Directive 2004/37/EC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding: Not listed.

15.1.5.4. Other EU Regulations
Directive 96/82/EC (Seveso II) on the control of major accident hazards involving dangerous substances: Not listed.
Directive 94/33/EC on the protection of young people at work: Not listed.
This Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006 and amended on 28 May 2015 by (EU) 2015/830.

15.1.6. Japanese Regulations
Japanese Industrial Standards (JIS) JIS Z 7253:2012
Waste disposal and public cleaning law
Law for Promotion of Effective Utilization of Resources

15.1.7. Taiwanese Regulations
Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials: Labeling requirements and other relevant provision of chemicals, this product is not classified as dangerous goods.
Toxic Chemicals Substance Control Law: Not Listed.
CNS 1030016 Safety of primary and secondary lithium cells and batteries during transport.

15.1.8. Chinese Regulations
General Rule for Classification and Hazard Communication of Chemicals (GB 13690-2009): Specifies the classification, labeling and hazard communication of chemicals in compliance with the GHS standard for chemical production sites and labeling of consumer goods.
General Rule for Preparation of Precautionary Labels for Chemicals (GB 15258-2009): Specifies the relevant application methods of precautionary labels for chemicals.
Safety Data Sheet for Chemical Products Content and Order of Sections (GB/T 16483-2008)

15.1.9. Brazil Regulations
National Solid Waste Policy (PNRS) of CONAMA in compliance with the directives and regulations of the National System for the Environment (SISNAMA).

15.1.10. Malaysian Regulations
Guidelines for the Classification of used Electrical and Electronic Equipment in Malaysia, 2nd Edition, 2010
Environmental Quality Regulation, 2005.
Scheduled Waste code SW103: Waste of batteries containing cadmium and nickel or mercury or lithium.

15.1.11. Other Regulations
None Listed.

15.2. Chemical Safety Assessment: Not applicable.

16. Other Information

Preparation Date: April 28th, 2020.
Prepared by: E-One Moli Energy (Canada) Limited. 20,000 Stewart Crescent, Maple Ridge, British Columbia, Canada V2X 9E7.

Revisions:

AA: (October 2014) First Release
AB: (January 2015) Document wide: Minor corrections to formatting and tab spacing. Section 1.3, added factory address. Section 1.4, indicated collect number to call. Section 2.0, Table 1 – added IATA, Taiwan, Japan and China entries. Section 3.1, added Taiwan, Japan and China entries. Section 13.2, added Taiwan and Japan disposal information subsections. Section 13.4, added classification of packaging materials. Section 15, added Japanese, Taiwanese and Chinese regulatory information. Section 16, updated Acronyms, added Japanese, Taiwanese and Chinese references to the disclaimer.
AC: (March 2015) Section 14.9.5 , added the transport by air detail information.
AD: (May 2015) Section 3.1, Table 3, spelling and CAS number correction.
AE: (May 2015) Section 16, added cell and pack capacity table to include watt hour rating and ELC.
AF: (June 2015) Updated sections 6, 7, 8, 10 and 15 to comply with current EU regulation EU2015/830 of 28 May 2015.
AG: (August 2015) Clarified 14.8.5 IATA Shipping regulations, removed explicit language on compliance to sections of packing instructions as that would be determined by the contents of the packages prepared by a trained shipper at the time of shipment and cannot be known at the time of this writing. Added ICR18650P to table in Section 16, Cell and pack capacities and watt hour ratings.
AH: (November 2015) Section 1.4 Updated Emergency contact number to include link to national poison control centers Section 4.1 added "contact your local poison control center" under ingestion hazard. Section 14.8 Updated and clarified Modal information for land, sea and air transport. Section 16 added table 7 detailing national poison control center contact information.
AI: (January 2016) Section 3.1 added Brazil requirements. Section 13.2 added Brazil recycling requirements. Section 15.1.9 added Brazil requirements. Section 16 Updated table 7 detailing national poison control center contact information.
AJ: (November 2016) Section 1.1 updated to include INR20700* cell. Section 2 updated table 1 and table 2. Added Section 5.1.5 TDG/DOT ERG Code Section 13.2.8 added Malaysian waste regulations. Section 14.3 added label pictures as examples. Added Section 14.6.2-3 ICAO/IATA, TDG/DOT ERG Codes. Section 14.8.5 added special provision A206 Section 15.1.2 updated Canadian regulations to include provincial requirements. Section 15.1.3 updated United States regulations. Section 15.1.10 added Malaysian regulations. Section 16 updated Table 6 to include INR20700A cell. Section 16 updated Table 6 to include weights in grams of each product. Section 16 Updated Table 7, National Emergency Poison Control Telephone number list Section 16 Updated literature and sources of data.
AK: (June 2017) Document wide: minor corrections to formatting and spelling. Section 13.2.1 updated Canadian disposal regulations. Section 13.2.2 updated United States disposal regulations. Section 13.2.4 updated European Union disposal regulations. Section 14.8.4 updated Modal information. Section 15.1.2 updated Canadian Regulations. Section 15.1.3 added US EPA Waste Code. Updated State Laws. Section 15.1.4 updated Australian and New Zealand regulations. Section 16 updated acronyms and literature references. **Revisions Continued on Next Page.**

Continued from Last Page AL: (January 2018) Section 14.8.1 updated modal information for Land (ADR) Section 14.8.2 updated modal information for Land (RID) Section 14.8.3 updated modal information for Land (ADN) Section 14.8.4 updated modal information to include Land (TDG) Section 14.8.6 updated modal information for AIR (IATA) Section 16, table 6, added 4 cell models. Section 16 updated acronyms and literature references.
AM: (February 2018) Section 1.4 updated CANUTEC emergency number. Section 11.5 updated to include cell or battery in definition. Section 14.3 updated lithium handling label. Section 15.1.3 Updated US Federal Regulations. Added California Proposition 65 Warning statement.
AN: (April 2018) Section 1.1 updated product codes Section 16, table 6, added 2 cell models.
AO: (December 2018) Section 14.6.3 IATA/ICAO ERG code updated. Section 14.8.5 updated IMDG Modal information. Section 16, table 6, added 2 cell models.
AP: (April 2019) Section 14.3 Updated lithium handling label. Section 14.8 updated Modal information.
AQ:(September 2019) Section 14.8.6 amended IATA modal information. Section 16, table 6, added 1 cell model.
AR: (December 2019) Document wide: minor corrections to spelling and grammar. Section 1.5 added a field for the addition of a local 24-hour emergency number outside of North America. Section 13.2.2 US waste regulations updated. Section 13.2.3 Australian waste regulations updated. Section 16, update of literature references.
AS: (April 2020) Section 16, Table 7 added minimum capacity values for 2 cell models.

Cell and pack capacities and watt hour ratings:

Model Number	Nominal Voltage (V)	Typical Capacity (Ah)	Watt Hour Rating (Wh) (Volts x Ah)	Equivalent Lithium Content (g) (cell Ah x 0.3 x #cells)	Weight (grams)
IBR18650B/BB/BC	3.60 V	1.50 Ah (1.4Ah Min)	5.40 Wh	0.45 g	45.0 g
IBR26700A	3.75 V	2.80 Ah	10.50 Wh	0.84 g	101.0 g
ICP1003450B	3.70 V	1.80 Ah	6.66 Wh	0.54 g	46.5 g
ICP103450CA	3.70 V	1.96 Ah	7.25 Wh	0.59 g	41.5 g
ICP103450DA	3.70 V	2.20 Ah	8.14 Wh	0.66 g	43.0 g
ICP103450M20A	3.70 V	2.00 Ah	7.40 Wh	0.60 g	42.0 g
ICR14500A	3.70 V	1.15 Ah	4.25 Wh	0.34 g	23.5 g
ICR18650H	3.70 V	2.20 Ah	8.14 Wh	0.66 g	47.5 g
ICR18650J	3.70 V	2.37 Ah	8.77 Wh	0.71 g	48.0 g
ICR18650K	3.70 V	2.60 Ah	9.62 Wh	0.78 g	50.0 g
ICR18650M	3.70 V	2.80 Ah	10.36 Wh	0.84 g	50.0 g
ICR18650P	3.70 V	3.20 Ah	11.84 Wh	0.96 g	50.0 g
IHR18650B	3.60 V	2.25 Ah	8.10 Wh	0.68 g	47.5 g
IHR18650BL	3.50 V	2.00 Ah	7.00 Wh	0.60 g	47.0 g
IHR18650BN	3.60 V	2.20 Ah	7.92 Wh	0.66 g	45.0 g
IHR18650C	3.60 V	2.05 Ah (2.0Ah Min)	7.38 Wh	0.62 g	47.0 g
IMR18650E	3.80 V	1.40 Ah	5.32 Wh	0.42 g	42.0 g
IMR26700A	3.80 V	2.90 Ah	11.02 Wh	0.87 g	101.0 g
INR18650A	3.60 V	2.55 Ah	9.18 Wh	0.77 g	47.0 g
INR18650-P26A	3.60 V	2.60 Ah	9.36 Wh	0.78 g	50.0 g
INR18650-P28A	3.60 V	2.80 Ah	10.08 Wh	0.84 g	48.0 g
INR18650-M30A	3.60 V	3.00 Ah	10.80 Wh	0.90 g	47.0 g
INR18650-M35A	3.60 V	3.45 Ah	12.42 Wh	1.04 g	50.0 g
INR20700A	3.60 V	3.00 Ah	10.80 Wh	0.90 g	60.0 g
INR20700-M42A	3.60 V	4.20 Ah	15.12 Wh	1.26 g	64.0 g
INR21700-P42A	3.60 V	4.20 Ah	15.12 Wh	1.26 g	67.0 g
INR21700-M50A	3.60 V	5.00 Ah	18.00 Wh	1.50 g	68.0 g
MCR1821J	7.40 V	2.40 Ah	17.76 Wh	1.44 g (2 cells)	107.0 g
ME202CJ	11.10 V	7.20 Ah	79.92 Wh	6.48 g (9 cells)	520.0 g
ME202EK	11.10 V	7.80 Ah	86.58 Wh	7.02 g (9 cells)	520.0 g

Table 6

National Emergency Poison Control Telephone number list
(The below table is a guide only and provided for reference, please consult your local government for updated information)

Country/State	National Poison Control Telephone Number	Country/State	National Poison Control Telephone Number
Algeria	+213 21 97 98 98	Italy – Milano	+39 02 6610 1029
Angola	+244 912 225 301	Italy – Turin	+39 011 663 7637
Argentina	+54 11 156 216 75 74	Jamaica	+1 888 764 7667
Australia	131126	Japan	0425 52 2511 ext 57740
Austria	+43 1 406 43 43	Jordan	109
Azerbaijan	+994 125 979 924	Kazakhstan	+7 3272 925 868
Belarus	+375 17 287 00 92	Kenya	0 800 720021
Belgium	+32 70 245 245	Latvia	+371 67042473
Brazil	None (Call 192 for Medical Emergency)	Lebanon	+961 3 174774
Bulgaria	+359 2 9154 378	Liechtenstein	112
Cambodia	+85 511 426 948	Lithuania	+370 5 236 20 52 / +370 687 53378
Canada – Alberta	1-800-332-1414	Luxembourg	070 245 245
Canada – British Columbia	1-800-567-8911	Macedonia	+38 923 147 635
		Malaysia	1 800 88 80 99
Canada – Manitoba	1-855-776-4766	Malta	112
Canada – New Brunswick	911	Mexico	066
Canada – Newfoundland and Labrador	1-866-727-1110	Mongolia	+976 992 755 95
Canada – Northwest Territories	1-800-332-1414	Morocco	+212 537 68 64 64
Canada – Nova Scotia	1-800-565-8161	Myanmar	+95 1 379 480
Canada – Nunavut	1-800-268-9017	Nepal	+97 71 435 38 77
Country/State	National Poison Control	Country/State	National Poison Control

	Telephone Number		Telephone Number
Canada – Ontario	1-800-268-9017	Netherlands	+31 30 274 88 88
Canada – Prince Edward Island	1-800-565-8161	New Zealand	+0800 764 766
Canada – Quebec	1-800-463-5060	Nicaragua	+505 228 97 150
Canada - Saskatchewan	1-866-454-1212	Norway	+47 22 59 13 00
Canada – Yukon Territory	(867) 393-8700	Oman	+968 245 665 10
Chile	+56 2 635 3800	Pakistan	0800-77767
China	+86 10 831 323 45	Paraguay	+595 21 220 418
Costa Rica	+506 2223 1028 / 911	Peru	+511 273 2318
Cuba	+53 64 10 00	Philippines	+632 524 10 78
Cyprus	1401	Poland	+48 42 63 14 724
Czech Republic	+420 22 49 192 93	Portugal	808 250 143
Denmark	82 12 12 12	Puerto Rico	+1 800 222 1222
Ecuador	1 800 836 366	Romania	+402 212 106 282
Egypt	+20 2 684 09 02	Russia – Moscow	+7 495-628-1687
Estonia	16662	Russia – St Petersburg	+7 921-757-3228
Finland	+358 9 471977	Saudi Arabia	+966 11 288 9999 ext 29590
France	0800 59 59 59	Senegal	+221 818 00 15 15
Georgia	+995 99 53 33 20	Serbia	+381 11 3608 440
Germany	19 240	Slovakia	+421 2 5477 4166
Germany – Baden-Wurttemberg	0761-19 240	Slovenia	+386 41 635 500
Germany – Bavaria	089-19 240	South Africa	+27 824 910 160
Germany – Berlin, Brandenburg	030-19 240	South Korea	129
Germany – Bremen, Hamburt Schleswig-Holstein, Niedersachsen	0551-19 240	Spain	+34 91 562 04 20
Germany – Hessen, Rhineland-Pfalz	06131-19 240	Sri Lanka	+94 11 268 61 43
Germany – Mecklenburg-Vorpommern, Sachsen, Sachsen Anhalt, Thüringen	0361-19 240	Sweden	112
Germany – Nordrhein-Westfalen	0228-19 240	Switzerland	145
Germany – Saarland	06841-19 240	Syria	+963 11 4452 155
Ghana	+233 (0) 800 100 46	Thailand	1367
Greece	210 7793777	Trinidad and Tobago	+1 868 800 2742
Guatemala	1-801-0029832	Tunisia	+216 1 335 500
Hong Kong	+852 2772 2211	Turkey	+90 0312 433 70 01
Hungary	(+36-80) 201-199	Taiwan	119
Iceland	+354 543 22 22	United Arab Emirates	800 424
India	+91 112 658 93 91	United Kingdom	111
Indonesia	+62 813 1082 6879	United Republic of Tanzania	+255 (0)683 159110
Iran	1490	Uruguay	1722
Iraq	+964 (0)780 191 3821	United States	1-800-222-1222
Ireland	+353 1 809 2166	Venezuela	+58 16 621 808
Israel	+972 4 854 19 00	Viet Nam	+84 (0)4 8697 501
Italy	+39 38 224 444	West Bank and Gaza Strip	1800 500 000
Italy – Bergamo	+39 800 883 300	Zimbabwe	+263 4 307 148

Table 7

Acronyms:

SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
CAS Number	Chemical Abstracts Service Registry Number
EINECS	European Inventory of Existing Commercial Chemical Substances
UN Number	United Nations Number
OSHA	Occupational Safety and Health Administration
ACGIH	American Conference of Governmental Industrial Hygienists
IMDG	International Maritime Dangerous Goods
IATA	International Air Transport Association
IUCLID	International Uniform Chemical Information Database
RTECS	Registry of Toxic Effects of Chemical Substances
R-Phrase	Risk Phrases
S-Phrase	Safety Phrases
%W/W	Percent weight for weight
OECD	Organization for Economic Co-Operation and Development

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail
HAZCHEM Code	Emergency action code of numbers & letters which gives information to emergency services
NOHSC	National Occupational Health and Safety Commission
AICS	Australian Inventory of Chemical Substances
TWA	Time-Weighted Average
STEL	Short term Exposure Limit
HSNO	Hazardous Substances and New Organisms Act 1996
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
METI	Japanese Ministry of Economy, Trade and Industry
BSMI	Taiwan Bureau of Metrology and Inspection
JIS	Japanese Industrial Standard
ERG	Emergency Response Guide
EPA	Environmental Protection Agency – USA.
DSL	Environment Canada Domestic Substances List
NDSL	Environment Canada Non Domestic Substances List
TDG	Transport of Dangerous Goods Regulations

Literature References and Sources of Data:

OECD Guidelines for Testing of Chemicals, Annex I: OECD Test Guidelines for Studies Included in SIDS.
Manual for the Assessment of Chemicals, Chapter 2 Data Gathering
International Toxicity Testing Guidelines
Hazardous Substance Information System - Guidance Material for Hazard Classifications
Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice.
Model Work Health and Safety Regulations - Transitional Principles
Workplace Exposure Standards for Airborne Contaminants
Australian Dangerous Goods Code 7th Edition
Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008 (2004)]
Guidance on the Classification of Hazardous Chemicals under the WHS Regulations
Assigning a Hazardous Substance to a Group Standard
User Guide to the HSNO Thresholds and Classifications
Summary User Guide to the HSNO Thresholds and Classifications of Hazardous Substances
Correlation between GHS and New Zealand HSNO Hazard Classes and Categories, HSNO Control Regulations
Record of Group Standard Assignment
Labelling of Hazardous Substances Hazard and Precautionary Information
Thresholds and Classifications under the Hazardous Substances and New Organisms Act 1996
Workplace Exposure Standards and Biological Exposure Indices
Handheld Battery Recycling - Guidelines for Lithium Batteries (Australian Battery Recycling Initiative) and Guidelines for Transport.
European Waste Catalog and Hazardous Waste List
IATA Dangerous Goods Regulations, 61st Edition, includes amendments.
European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) 2017
Transport of Dangerous Goods Regulations (International Harmonization Update, 2016) SOR/2017-137
IMO IMDG Code, Volume 1 and 2, 2016 Edition and including amendment 38-16
United Nations Recommendations on the Transport of Dangerous Goods – Manual of Tests and Criteria Rev. 6, Amendment 1.
World Health Organization list of National Poison Control Telephone Numbers
United States Environmental Protection Agency – Enforcement Act, EPA 300-N-02-002, the Battery Act.

Disclaimer: This Safety Data Sheet was prepared in accordance with criteria and requirements of the Hazardous Products Act and the Controlled Products Regulations (Canada), SafeWork Australia (Australia), European Union Commission Directives (EU/EC), Japanese Industrial Standard (JIS), Taiwan Bureau of Metrology and Inspection (BSMI), China Regulation GB/T 16483-2008 and the Occupational Safety and Health Administration (OSHA) using information provided by the manufacturer and other sources. The information in the Safety Data Sheet is offered for your consideration and guidance when exposed to these products.

E-One Moli Energy (Canada) Limited expressly disclaims all expressed or implied warranties and assumes no responsibilities for the accuracy or completeness of the data contained herein. The data in this Safety Data Sheet does not apply to use with any other product or in any other process.

This Safety Data Sheet may not be changed or altered in any way without the expressed knowledge and permission of E-One Moli Energy (Canada) Limited.

[End of Safety Data Sheet]

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street Phoenix, Arizona 85007
(602) 771-2300 www.azdeq.gov

MSGP No Discharge Certificate (NDC)

This "No Discharge Certification" is an optional submission and is not required by the Clean Water Act (CWA) or Arizona Law.

This "No Discharge Certification" is associated with the following project or activity:

Certificate #: 89968

Type:**Multi-Sector General Permit | No Discharge Certificate**
Issue Date:**07/02/2021**
Expiration Date:**07/01/2026**

Issued to:

Name:**LI-CYCLE INC**
Address Line 1:**100 LATONA ROAD**
Address Line 2:**350**
City:**ROCHESTER**
State:**NY** zip : **14652**

Facility Information:

Name:**Li-Cycle, Inc. Spoke 3**
Address Line 1:**4461 E NUNNELEY RD**

City:**GILBERT**
Zip:**85296**
Primary Activity: **N - SCRAP RECYCLING FACILITIES | N1 | SCRAP RECYCLING AND WASTE RECYCLING FACILITIES EXCEPT SOURCE | 5**

You have indicated that stormwater associated with industrial activity will not discharge to a Water of the U.S., either directly or by way of a conveyance (such as a ditch, channel, street, storm sewer, etc.) for the following reason(s):

- **On-Site Retention/Evaporation/Percolation**
- **Drywells # of drywells on-site:10**

If stormwater will discharge to a Water of the U.S., you must first obtain coverage under a permit issued by ADEQ that authorizes such discharge(s). Failure to do so is a violation of the Clean Water Act and Arizona Revised Statutes, Title 49, Chapter 2, Article 3.1, and is subject to enforcement action

I understand that this certification is not required by law and does not constitute an approval by ADEQ. I further understand that ADEQ may inspect to verify that there is no discharge to a Water of the U.S. either directly or by way of a conveyance and that any unpermitted discharge may be subject to an enforcement action under the Clean Water Act and Arizona law.

Maricopa County AIR QUALITY DEPARTMENT

Permitting Division
Phone: 602-506-6010
Fax: 602-506-6985

Maricopa.gov/AQ
CleanAirMakeMore.com

LI-CYCLE INC.
ATTN: ANDREW WONG
100 LATONA ROAD, BUILDING 350
ROCHESTER, NEW YORK 14615

This Permit is issued in accordance with Maricopa County Air Quality Department (MCAQD) Regulations, Rule 200, §303, and Arizona Revised Statutes, §49-404c and §49-480. The Permit is issued to provide regulators, site operators or owners, and members of the public, a clear picture of what the Permit holder is required to do to meet regulatory standards. As the Permit holder, you are expected to review this Permit, become familiar with its provisions and conditions and to operate in conformance with them. The Permit (and the underlying regulations upon which it is based) is an enforceable document. Failure to conform to the emission limits and any other condition contained in the Permit is a violation of law and will form the basis of enforcement action by the department which may include civil or criminal sanctions.

If the MCAQD Control Officer determines that additional monitoring, sampling, modeling and/or control of emissions from the facility may reasonably be needed to provide for the continued protection of public health, safety and/or welfare, the MCAQD Control Officer will amend the provisions of this Permit. This Permit may be subject to suspension or revocation for cause including nonpayment of fees, noncompliance with Arizona State Statutes, Maricopa County Air Quality Regulations, or the attached Permit Conditions, or if the MCAQD Control Officer determines that significant misrepresentation exists in the application and supporting documentation filed to obtain or modify this Permit.

If you need assistance with the permit, please contact the Business Assistance office at 602-506-5102 or contact the undersigned at 602-506-7248. Email communications may be sent to AQPermits@maricopa.gov.

MARICOPA COUNTY AIR QUALITY DEPARTMENT

Permitting Division

3800 N. Central Avenue, Suite 1400, Phoenix, Arizona 85012
Phone: (602) 506-6010 Fax: (602) 506-6985

AIR QUALITY PERMIT TO OPERATE AND/OR CONSTRUCT

(As required by Title 49, Chapter 3, Article 2, Section 49-480, Arizona Revised Statutes)

ISSUED TO

Li-Cycle Inc.
4461 E Nunneley Rd (Building 2)
Gilbert, AZ 85296

This air quality permit to operate and/or construct does not relieve the applicant of the responsibility of meeting all air pollution regulations.

THE PERMITTEE IS SUBJECT TO THE SPECIFIC AND GENERAL CONDITIONS IDENTIFIED IN THIS PERMIT.

FACILITY NUMBER: F041623 **LEGACY PERMIT NUMBER:** n/a

PERMIT NUMBER: P0008317 **REVISION DATE:** 10/15/2021

EXPIRATION DATE: 10/15/2026

Todd Martin

Todd Martin, Non-Title V Permit Supervisor

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Any cited regulatory paragraphs or section numbers refer to the version of the rules and regulations that were in effect on the first date of public notice of the applicable Permit Condition unless specified otherwise. However, in the event the rules and regulations are amended during the term of this Permit, the amended rules and regulations shall apply to this Permit. Whenever the term, Control Officer, is used in this Permit it shall be interpreted to mean, Control Officer or designated representative. Where the term "Rule" appears, it shall be construed to mean "Maricopa County Air Pollution Control Regulations" unless otherwise noted.

SPECIFIC CONDITIONS

FACILITY WIDE

1. Air Pollution Prohibited:

No person shall discharge from any source whatever into the atmosphere regulated air pollutants which exceed in quantity or concentration that specified and allowed in these rules, the Arizona Administrative Code [AAC] or Arizona Revised Statutes [ARS], or which cause damage to property, or unreasonably interfere with the comfortable enjoyment of life or property of a substantial part of a community, or obscure visibility, or which in any way degrade the quality of the ambient air below the standards established by the Board Of Supervisors or the Director.

[SIP Rule 100 §301]

a. Material Containment Required: Materials including, but not limited to, solvents or other volatile compounds, shall be processed, stored, used and transported in such a manner and by such means that they will not unreasonably evaporate, leak, escape or be otherwise discharged into the ambient air in such quantities or concentrations as to cause air pollutions smells, aromas or stenches commonly recognized as offensive, obnoxious or objectionable to a substantial part of a community. Where means are available to effectively reduce the contribution to air pollution from evaporation, leakage or discharge, the installation and use of such control methods, devices or equipment shall be mandatory.

[Rule 320 §302] [SIP Rule 32.C]

b. Reasonable Stack Height Required: Where a stack, vent or other outlet is at such a level that air contaminants are discharged to adjoining property, the Control Officer may require the installation of abatement equipment or the alteration of such stack, vent, or other outlet to a degree that will adequately dilute, reduce or eliminate the discharge of air contaminants to adjoining property.

[Rule 320 §303] [SIP Rule 32.D]

2. Opacity:

a. No person shall discharge into the ambient air from any single source of emissions any air contaminant, other than uncombined water, in excess of 20% opacity for a period aggregating more than three minutes in any 60-minute period.

[SIP Rule 300 §301]

b. If any non-compliant visible emissions (excluding water vapor) are detected or reported, the Permittee shall determine the cause and/or the source of emissions. The Permittee shall then take immediate corrective action(s) and if necessary, shut down the applicable equipment. If visible emissions (excluding water vapor) exceed the above opacity standards subsequent to implementing corrective action(s), the Permittee shall shut down the applicable equipment and institute repairs or changes necessary to ensure compliance prior to resuming operations.

[SIP Rule 220 §302.2]

c. Compliance with the opacity requirement shall be determined by observations of visible emissions conducted in accordance with EPA Reference Method 9 as modified by EPA Reference Method 203B.

[SIP Rule 300 §501]

3. Allowable Emissions:

a. The Permittee shall not allow emissions into the atmosphere in excess of any of the following:

	Twelve Month Rolling Total Emission Limits lbs
Particulate Matter <10 Micron Diam. (PM_{10})	200.0
Particulate Matter <2.5 Micron Diam. ($PM_{2.5}$)	200.0
Volatile Organic Compounds (VOC)	1000.0

b. The 12-month rolling total emissions shall be calculated monthly by the end of the following month by summing the emissions over the most recent 12 calendar months. The Permittee shall keep this emission record on-site for inspection or submittal upon request.

The 12-month rolling sum is the total amount from the past 12 months. As the 12-month period rolls forward each month, the amount from the latest month is added and the one-year-old amount is subtracted. The result is a 12-month sum that has rolled forward to the new month.

c. Upon the request of the Control Officer, the Permittee shall calculate a daily emission rate by dividing the monthly emissions by the number of days of operation for that month.

d. VOCs, PM_{10} and $PM_{2.5}$ emissions shall be calculated using the same methodology as in permit application.

[SIP Rule 220 §302.2][Rule 241 §§304, 305, 308]

PARTICULATE MATTER FROM PROCESS INDUSTRIES

4. Operational Limitations:

a. All primary comminuting operations shall be submerged in water.

b. All ancillary comminuting system and operations which includes cathode processing shall be exhausted without bypass to a venturi scrubber at all times during operation.

[SIP Rule 220 §302.2][Rule 241 §§304, 305, 308]

c. Emission Control System (ECS):

i. The Permittee shall control emissions from the following processes using a venturi-scrubber:

1) Sorting,

2) Screening, and

3) Conveying.

ii. The venturi scrubbers shall be operated in accordance with an approved operation and maintenance plan. For the purposes of this Permit Condition, a properly functioning ECS shall be defined as having a removal efficiency of at least 93% by weight for particulate matter that is supported by manufacturer's data or the Department approved performance test. This ECS shall be operated within the parameters specified in an approved Operation and Maintenance Plan required by this permit.

[Rule 311 §304] [SIP Rule 311 §305] [SIP Rule 241 §302]

5. Operation and Maintenance (O&M) Plan Requirements:

a. Unless an O&M Plan has previously been submitted and approved, the Permittee shall submit an approvable O&M Plan for each venturi scrubber to the Control Officer, Attn: Compliance Division Manager, within 45 days of the initial issuance of this permit, or within 45 days of the equipment receiving exhaust, in accordance with the Department guidelines. The Permittee shall revise the O&M Plan upon the request of the Control Officer and whenever substantive changes are made to the equipment or plan, in accordance with the Department guidelines.

b. The O&M Plan shall specify key system operating parameters, such as temperatures, pressures drop, water recirculation rate (possibly pH level) and/or flow rates, necessary to determine compliance and

describe in detail procedures to maintain the approved emission control system. The Permittee shall monitor, operate and maintain the equipment in accordance with the device's approved O&M Plan.

c. Changes to an existing O&M Plan shall be made by submitting a complete, revised O&M Plan along with a cover letter identifying all changes and the reason for such changes. The Permittee may implement the changes addressed in the revised O&M plan after it submits the revision to the Control Officer. Unless disapproved in writing by the Control Officer, the Permittee shall continue to operate in accordance with the revised O&M plan.

d. If any control device is found to be operating outside a specified range, the Permittee shall immediately take corrective action to bring the device back into the specified operating range or shut down the device and the associated equipment vented to it.

e. If a pattern of excursions, as determined by the Control Officer or the Permittee, of operation outside the specified operating range develops, the Permittee shall submit a Corrective Action Plan to the Control officer for approval to bring the devices back into the specified operating range. The Plan shall be submitted to the Control Officer, Attn: Compliance Division Manager, within 30 days of the determination of the existence of excursions.

[SIP Rule 220 §302.4][SIP Rule 311 §306]

6. Recordkeeping:

The Permittee shall keep the following records on site and available upon request. These records shall be updated each day of operation and be retained for 5 years:

a. Maintain a daily record of the total weight of all process materials including raw materials, additives, and fuels which are put into a process flow. This shall include all materials which participate in the process and are changed in mass, form, state or in other characteristics by means of their interaction in the given process.

[Rule 311 §§502, 503][SIP Rule 311 §502]

b. The Permittee shall retain all records pertaining to the repairs and schedules required to restore the treatment process after upset. The Permittee shall retain records of the operational parameter tests used to ensure proper operation of the process.

[SIP Rule 220 §§302.7, 500] [SIP Rule 100 §504]

c. O&M Plan:

i. Monitoring and maintenance records specified in the O&M Plan:

1) Monitoring Records shall consist of an operations log sheet to be completed for every day the process and/or control device is in operation. Operations log sheets shall, at a minimum, contain the following information: equipment identification; date and time of readings; identification of the individual recording the data; operating parameters to be monitored including units of measure, operating limits (upper and lower limits), and locations for recording measurements; measurement frequency; and if applicable, corrective action taken. Account for any periods of operation when the control device was not operating.

2) Maintenance Records shall, at a minimum, contain the following information: equipment identification; date; identification of the individual performing the maintenance check; procedures to be performed including frequency of occurrence; results of inspection (acceptable, nozzle plugged, belt cracked, etc.); and corrective action taken (none, cleaned nozzle, replaced belt, etc.).

ii. Whenever the O&M Plan requires that maintenance be performed, a record shall be made of the maintenance actions taken within 24 hours of maintenance completion.

iii. An explanation shall be recorded for any scheduled maintenance that is not performed during the period designated in the O&M Plan.

[SIP Rule 220 §302.7][Rule 311 §502.3][SIP Rule 311 §502.3]

d. Records of the 12-month rolling total emissions, as required by Permit Condition 3.a.

[SIP Rule 220 §302.7]

PROCESS VOCS CONTROLLED BY CARBON ADSORPTION

7. Emission Limitations:

a. No person shall store, discard, or dispose of VOC-containing material in a way intended to cause or allow the release of VOC to the atmosphere

b. The Permittee shall not directly discharge from the process vessels into the atmosphere at any time without first passing such material through the carbon adsorption system.

[Rule 330 §306][SIP Rule 220 §302.2][Rule 320 §302] [SIP Rule 32.C]

8. Operational Limitations:

The Permittee shall comply with the following operational limitations:

a. Limitations–Operations Involving Heat:

i. The temperature of the solvents used in all product recovery vessels shall be maintained below 200°F (93.3°C). The temperature shall be measured daily during operation for each day the equipment is operated.

[Rule 330 §301]

9. Emission Control Requirements:

a. Emissions from comminuting devices and all product recovery vessels shall be vented to a carbon adsorption system with an overall VOC control efficiency (capture plus processing) of at least 80% by weight

[Rule 330 §304][Locally Enforceable Only]

10. Equipment Cleanup:

The Permittee shall not use any liquid materials containing more than 10% VOC for the cleanup of equipment unless:

a. The used cleaning liquids are collected in a container which is closed when not in use and is disposed of in a manner such that VOC is not emitted into the atmosphere, or

b. The equipment is disassembled and cleaned in a solvent vat which is closed when not in use, or cleaning is done by other methods, approved in writing by the Control Officer, which limit evaporation.

[Rule 330 §305][Locally Enforceable Only]

11. VOC Containment and Disposal:

The Permittee shall not store, discard, or dispose of VOC or VOC-containing material in a way intended to cause or to allow the evaporation of VOC to the atmosphere. Reasonable measures shall be taken to prevent such evaporation which include but are not limited to the following:

a. All materials from which VOC can evaporate, including fresh solvent, waste solvent and solvent-soaked rags and residues, shall be stored in closed containers when not in use, and

[Rule 330 §306][SIP Rule 32.C]

b. Such containers one gallon and larger shall be legibly labeled with their contents.

[Rule 330 §306.2][Locally Enforceable Only]

12. Operating Requirements:

a. Exhaust from process vessels shall be vented to a carbon adsorption system consisting of a granulated activated carbon (GAC).

b. The Permittee shall install a VOC breakthrough indicator for each GAC unit.

i. The Permittee shall operate and maintain each VOC breakthrough unit according to the manufacturer's written instructions, or procedures over the entire life of the breakthrough indicator.

c. The carbon adsorption system shall be operated in accordance with an O&M Plan, as required by Permit Condition 13.- Operations and Maintenance (O&M) Plans.

d. The Permittee shall not remediate any gas stream entering the carbon adsorption system when any of the VOC breakthrough indicators show the media is either spent or getting close to breakthrough.

e. The Permittee shall not exceed the manufacturer's recommended flow rate. The carbon adsorption system shall not contain a valve or any other device which will either dilute or restrict the flow of the gasses unless the position of the device can be measured and controlled. If a device is installed, its position must be measured and recorded any time a test sample is taken which will be used to calculate either the mass flow rate of VOC into the atmosphere or the removal efficiency of the control device.

f. Whenever breakthrough is determined the process vessels shall be immediately shut down and the GAC be removed from service. The process shall not be restarted until the media is replaced.

[SIP Rule 220 §302.2] [Rule 241 §302, 305, 307]

g. The Permittee shall store spent carbon removed from the system in closed containers prior to removal from the site.

[Rule 320 §302] [SIP Rule 32.C]

13. Operations and Maintenance (O&M) Plans:

a. Unless an O&M Plan has been previously submitted and approved, the Permittee shall submit an approvable O&M Plan for each carbon adsorption system at the facility to the Control Officer, Attn: Permitting Division Manager, within 45 days of the initial issuance of this permit, or within 45 days of the equipment receiving exhaust, in accordance with the Department guidelines:

b. The O&M Plan shall specify key system operating parameters, such as the following for each GAC unit to determine compliance and describe in detail procedures to maintain the approved emission control system. The Permittee shall monitor, operate and maintain the equipment in accordance with the device's approved O&M Plan. At a minimum the plan shall include:

i. Daily log of differential pressure,

ii. For each GAC system, maintain a daily log of the color indicated on the breakthrough indicator,

iii. Monthly recording of effluent concentration, and

iv. Date, and year on saturation media change out.

c. Changes to an existing O&M Plan shall be made by submitting a complete, revised O&M Plan along with a cover letter identifying all changes and the reason for such changes. The Permittee may implement the changes addressed in the revised O&M plan after it submits the revision to the Control Officer. Unless disapproved in writing by the Control Officer, the Permittee shall continue to operate in accordance with the revised O&M plan.

d. If any control device is found to be operating outside a specified range, the Permittee shall immediately take corrective action to bring the device back into the specified operating range or shut down the device and the associated equipment vented to it.

e. If a pattern of excursions of operation outside the specified operating range develops, as determined by the Control Officer or the Permittee, the Permittee shall submit to the Control Officer for approval a Corrective Action Plan to bring the devices back into the specified operating range. The Plan shall be submitted to the Control Officer, Attn: Compliance Division Manager, within 30 days of the determination of the existence of excursions.

[SIP Rule 220 §302.4]

14. Monitoring:

The Permittee shall install and maintain a GC VOC breakthrough indicator on the out streams of each vapor control system to provide indication of the breakthrough of organic vapors.

[SIP Rule 220 §302.4][SIP Rule 41]

15. Recordkeeping:

The Permittee shall maintain the following records for a period of at least five years from the date of the records and make them available to the Control Officer upon request:

a. Monthly records of the 12-month rolling total operating hours of each carbon adsorption system.

b. Copies of the manufacturer's specifications for the carbon adsorption system on site.

c. In order to determine compliance to P.C. 8.a.i the daily temperature log of solvents used in all product recovery vessels shall be maintained below 200°F (93.3°C). The temperature shall be measured daily during operation for each day the equipment is operated.

d. Monitoring and maintenance records specified in the O&M Plan:

i. Monitoring Records shall consist of an operations log sheet to be completed for every day the process and/or control device is in operation. Operations log sheets shall, at a minimum, contain the following information: equipment identification; date and time of readings; identification of the individual recording the data; operating parameters to be monitored including units of measure, operating limits (upper and lower limits), and locations for recording measurements; measurement frequency; and if applicable, corrective action taken. An explanation shall be recorded for any periods of operation when the control device was not operating.

ii. Maintenance Records shall, at a minimum, contain the following information: equipment identification; date; identification of the individual performing the maintenance check; procedures to be performed including frequency of occurrence; results of inspection (acceptable, nozzle plugged, belt cracked, etc.); and corrective action taken (none, cleaned nozzle, replaced belt, etc.).

e. Whenever the O&M Plan requires that maintenance be performed, a record shall be made of the maintenance actions taken within 24 hours of maintenance completion.

f. An explanation shall be recorded for any scheduled maintenance that is not performed during the period designated in the O&M Plan.

g. The Permittee shall maintain copies of the manufacturer's specifications for each unit on site.

[SIP Rule 220 §§302.7, 302.8, 501]

GENERAL CONDITIONS

16. Posting of Permit:

This Permit shall be posted in a clearly visible and accessible location on the site where the equipment is installed.

[SIP Rule 200 §312]

17. Compliance:

a. The issuance of any Permit or Permit revision shall not relieve the Permittee from compliance with any Federal laws, Arizona laws, or the County or SIP Rules, nor does any other law, regulation or permit relieve the Permittee from obtaining a Permit or Permit revision required under the County Rules.

[SIP Rule 200 §§309, 310.3][SIP Rule 220 §406.3]

b. The Permittee shall comply with all conditions of this Permit including all applicable requirements of Federal laws, Arizona laws, and Maricopa County Air Pollution Control Rules and Regulations now in effect and as amended in the future. Any Permit noncompliance is grounds for enforcement action, Permit termination or revocation, or for denial of a renewal application. In addition, non-compliance with any federally enforceable requirements constitutes a violation of the Clean Air Act.

[SIP Rule 200 §310.4][SIP Rule 220 §302.24][A.A.C. R18-2-306.A.8.a]

c. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with these Permit Conditions.

[SIP Rule 220 §302.10][A.A.C. R18-2-306.A.8.b]

d. Rights and Privileges: This Permit does not convey any property rights or exclusive privilege of any sort.
[SIP Rule 220 §302.12]

e. Fees: The Permittee shall pay all fees to the Control Officer in accordance with Rule 280. No permit or permit revision is valid until the applicable permit fee has been received and until the permit is issued by the Control Officer.
[SIP Rule 200 §409][Rule 280 §302][A.R.S. 49-480(D)][SIP Rule 28]

18. Malfunctions, Emergency Upsets, and Excess Emissions:
An affirmative defense of an emergency, excess emission, and/or during startup and shutdown shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence as outlined in Rule 130 for emergencies and Rule 140 for excess emissions.
[Rule 130 §§201, 400][Rule 140 §§400, 500][SIP Rule 140]

19. Revision / Reopening / Revocation:
The Permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any Permit Condition.
[SIP Rule 220 §302.11]

20. Permit Revision or Minor Permit Revision:

a. A source may implement the changes addressed in the administrative permit revision application or in a minor permit revision application after it files the application, unless the revision triggers a minor NSR modification under Rule 241-Minor New Source Review (NSR) of these rules.

b. A source shall still comply with any Federal laws, Arizona laws, or these rules, and a source shall comply with the "new" permit conditions that the source proposes in its application for a minor permit revision. The Control Officer may enforce the existing permit conditions if the Control Officer determines that the source is not complying with the "new" permit conditions.
[SIP Rule 220 §406.3.a.]

21. Reporting:
Upon request of the Control Officer and as directed by the Control Officer, the Permittee shall complete and shall submit to the Control Officer an annual emissions inventory report. The report is due by April 30 or 90 days after the Control Officer makes the inventory forms available, whichever occurs later. The annual emissions inventory report shall be in the format provided by the Control Officer. The Control Officer may require submittal of supplemental emissions inventory information forms for air contaminants under ARS §49-476.01, and ARS §49-480.03.
[Rule 100 §505] [SIP Rule 40]

22. Records:

a. The Permittee shall furnish information that the Control Officer may request in writing to determine whether cause exists for revising, revoking and reissuing this permit, or terminating this permit, or to determine compliance with this permit. The information shall be provided in a timeframe specified by the Control Officer. Upon request, the Permittee shall also furnish to the Control Officer copies of records required to be kept by this Permit. For information claimed to be confidential, the Permittee shall furnish a copy of such records directly to the Administrator along with a claim of confidentiality.
[SIP Rule 220 §302.13][SIP Rule 40]

b. If the Permittee fails to submit any relevant facts or has submitted incorrect information in a permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, the Permittee shall provide additional information as necessary to address any requirements that become applicable to the source after the date a complete application is filed but prior to release of a proposed permit. Willful misrepresentation of facts in a permit application is cause for revocation or denial of a permit.
[SIP Rule 220 §§301.5, 301.6]

23. Right to Entry:

a. The Control Officer during reasonable hours, for the purpose of enforcing and administering County or SIP Rules or the Clean Air Act, or any provision of the Arizona Revised Statutes relating to the emission or control prescribed pursuant thereto, may enter every building, premises, or other place, except the interior of structures used as private residences. Every person is guilty of a petty offense under A.R.S. 49-488 who in any way denies, obstructs or hampers such entrance or inspection that is lawfully authorized by warrant.

b. The Permittee shall allow the Control Officer or his designated representatives, upon presentation of proper credentials (e.g., Maricopa County Air Quality Department identification) and other documents as may be required by law, to:

i. Enter upon the Permittee's premises where a source is located or emissions-related activity is conducted, or where records are required to be kept pursuant to the conditions of the permit;

ii. Have access to and copy, at reasonable times, any records that are required to be kept pursuant to the conditions of the permit;

iii. Inspect, at reasonable times, any sources, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required pursuant to this permit;

iv. Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the Permit or other applicable requirements; and

v. Record any inspection by use of written, electronic, magnetic, and photographic media.

[SIP Rule 100 §105][SIP Rule 220 §302.17-21]

24. Severability:

The rules, paragraphs, clauses, provisions, and/or sections of this Permit are severable, and, if any rule, paragraph, clause, provision, and/or section of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

[SIP Rule 220 §302.9]

EQUIPMENT LIST

- **Venturi Scrubbers**
- **Carbon Adsorption Cannisters**
- **Conveyors**
- **Process Vessels**
- **Hoppers**